METHODOLOGY AND MANAGEMENT OF CYSTIC SWELLINGS OF SCROTUM

Dissertation submitted to

THE TAMILNADU

DR. M.G.R. MEDICAL UNIVERSITY

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For the Award of the Degree of

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(BRANCH - I)

DEPARTMENT OF GENERAL SURGERY

MADURAI MEDICAL COLLEGE AND GOVERNMENT RAJAJI HOSPITAL

MADURAI – 625020

APRIL – 2015

CERTIFICATE

This is to certify that this dissertation titled **METHODOLOGY AND MANAGEMENT OF CYSTIC SWELLINGS OF SCROTUM" at Government Rajaji Hospital, Madurai** submitted by **DR. F.BIRAVINTH SOLOMON**, to the faculty of General Surgery, **The Tamilnadu Dr. M.G.R. Medical University, Chennai** in partial fulfillment of the requirement for the award of MS degree (Branch I) General Surgery, is a bonafide research work carried out by him under my direct supervision and guidance from October 2012 to September 2014.

Prof. Dr. S. LAKSHMI, M.S., D.G.O.,
Professor and Unit Chief,
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Madurai.

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I have great pleasure in forwarding it to The TamilnaduDr. M.G.R. Medical University, Chennai.

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DECLARATION BY THE CANDIDATE

I, **DR. F.BIRAVINTH SOLOMON**, solemnly declare that the dissertation titled **"METHODOLOGY AND MANAGEMENT OF CYSTIC SWELLINGS OF SCROTUM"** is a bonafide and genuine research work carried out by me in the Department of General Surgery, Madurai Medical College, during the period of 2012 to 2013 , under the guidance and supervisionof **DR. S. LAKSHMI, M.S., D.G.O.,** Professor of Surgery, and overall guidance by **DR. A. SANKARA MAHALINGAM, M.S.,** Professor and Head, Department of Surgery, Madurai Medical College, Madurai. This is submitted **to TheTamilnaduDr. M.G.R. Medical University, Chennai**, in partial fulfillment of the regulations for the award of MS degree (Branch I) General Surgery course on April 2015.

Place : Madurai

Date: **SIGNATURE**

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Place: Madurai

Date: **F. BIRAVINTH SOLOMON**

LIST OF ABBREVIATIONS USED

T APP	:	Trans abdominal preperitoneal
T EPP	:	Totally extra preperitoneal
IPOM	:	Intraperitoneal onlay mesh
PTFE	:	Polytetrafluroethylene
OT	:	Operating theatre
NS	:	Normal saline
SSI	:	Surgical site infection
VRE	:	Vancomycin resistant enterococci
Hb	:	Hemoglobin
C/s	:	culture/sensitivity
DSI	:	Deep surgical site infection
POD	:	Post op day
I&D	:	Incision & drainage

CONTENTS

INTRODUCTION

Cystic swellings of the scrotum are a common surgical problem. Cystic swellings of scrotum affect the physical well being of the patient, presents as varied etiology, Since scrotum is placed outside the lower abdomen they are easily accessible for clinical examination and self examination.

The spectrum consists of hydrocoele (the commonest cause), epididymal cysts, spermatocoele, haematocoele, pyocoele, chylocoele, and sebaceous cysts.

Cystic swelling of scrotum are usually painless and can attain a very big size without causing much discomfort to patient. The mortality from this condition is negligible. The scrotum is liable to traumatic injury due to their hanging down position.

Hydrocoele is an abnormal collection of serous fluid in some part of the processus vaginalis, usually the tunica[1]. It is divided into simple (scrotal) and communicating[2]. This is known by the common terminology 'cheer' in northern parts of Karnataka.

Epididymal cysts represent cystic degeneration of the epididymis[2]. Spermatocoele is a retention cyst arising from either the vasa efferentia of the testes or from the epididymis[3].

The scrotum has abundant quantity of sebaceous glands, which may become infected and obstructed forming sebaceous cysts.

Because of the presence of hair follicles, the scrotum is one of the sites for folliculitis (Boil) etc. Secondary hydrocoele occur secondary to disease of the testes and epididymis and its management consists of treatment of the underlying cause.

Filarial hydrocoele and chylocoele account for upto 80 percent of hydrocoele in some tropical countries where the parasite (Wuchereria Bancrofti) is endemic. Cystic swellings of scrotum are invariably painless and can attain very large size. The mortality from this condition is negligible.

Indications for treatment includes pain, discomfort, and the cosmetic appearance of the scrotum[4].

Conventional treatments (for primary hydrocoele, epididymal cyst, and spermatocoele) include repeated aspiration, aspiration and injection of sclerosant or surgery. Aspiration and injection of sclerosant can cause severe pain, and simple aspiration has to be repeated and carries risk of infection and haematoma formation[5].

The gold standard continues to be surgical extirpation of the cystic lesion[6].

There is no specific treatment for secondary hydrocoele. Management of this condition consists of treatment of the underlying cause. Surgical treatment of idiopathic hydrocoele includes 4 basic techniques[7] –

1. Lord's plication[8],
2. Winkelmann's partial excision and eversion of the sac
3. Jaboulay's eversion of the sac[9] and
4. Radical excision of the sac[7]. Recent quicker operations in adult consists of the window operations or vaginal operations[10,11].

Congenital hydrocoele are treated by herniotomy. Treatment of epididymal cyst and spermatocoele consists of the excision of the cysts[2,3].

The complications during operations on the scrotum are bleeding, injury to the cord structures, torsion of testes due to faulty reposition. The common post operative complications include haematoma and odema[12], which can be prevented by meticulous haemostasis and post operative scrotal support.

Because of varied etiology, their mode of presentation and management is unique for each. With this background a clinical study of cystic swellings of the scrotum was undertaken. The present study includes the review of literature regarding the classification, etiology, clinical presentation and management of cystic scrotal swellings.

A study of 50 cases of cystic swellings of scrotum is being presented here.

OBJECTIVES

- To study the Etiology of Cystic swellings of scrotum and to evaluate the incidences of various cystic swellings of the scrotum.

- To study the mode of presentation of various cystic swellings and diagnostic modalities in the management of these.

- To study the various surgical procedures in the treatment of cystic swellings of scrotum and analyzing the results for the betterment of the procedure.

- To study the Postoperative complications and measures to prevent these.

- Comparison of small incision versus large incision in operating cystic swelling of scrotum

REVIEW OF LITERATURE

1. HISTORICAL ASPECTS

Cystic swellings occur more commonly in the scrotum than anywhere else in the body. They have been known to occur since ancient times and have been reported as far back as 5th century B.C. Sushrutha, the father of Indian surgery described hydrocoele in his book 'Sushrutha Samhitha'. According to Sushrutha any swelling in the body is due to Thridosha (i.e., 3 faults) they are vata, pitta and kafa.

Sushrutha described surgical treatment of hydrocoele to be punctured and tapped. Celsus (53 BC to 7 AD) distinguished hydrocoele from hernia by its translucency.

Ambrosis Pare coined the term hydrocoele in the 5th century, Percival pott wrote a masterpiece on hydrocoele in 1762.

Dupuytren described hydrocoele-en-bissac in 1834 and the name abdominoscrotal hydrocoele was proposed by *Bickle* in 1919[13].

Mathew Jaboulay (1860-1913) professor of surgery at lyons, france described the operation and partial excision and eversion of sac for hydrocele.

Marcheffi (1902) was the first to analyse hydrocoele fluid biochemically.

In 1907, *Andrews* described the bottle operation for treatment of hydrocoele[14]. *Ozdilek* described the window operation in 1957[15].

Mackay and Baznett in 1958 treated congenital hydrocoele by ligating and dividing the processus vaginalis through inguinal route and aspiration of the

hydrocoele fluid.

Wilkinson (1960) described his operation for large hydrocoele.

In 1962, Montella and Fontana tried injection of hydrocortisone into the hydrocoele sac after completely aspirating the fluid. Postoperative haematoma seemed to be an accepted risk following operations for radical cure of idiopathic hydrocoele.

In 1964, peter H. Lord described the technique of plication, a bloodless operation for the radical cure of idiopathic hydrocoele. In 1970, Lord PH described a bloodless operation for spermatocoele and epididymal cyst[16].

Wilkinson JL advocated an operation for large scrotal hydrocoele in 1973[17].

Sharma LS and Jhawer PK described a simplified minimal dissection technique for hydrocoele[18]. The early results of a prospective study of sclerotherapy for hydrocoele and epididymal cyst were presented in 1979[19].

A study done by Dandapat et al., in 1990 showed partial arrest of spermatogenesis in 10 percent and total arrest of spermatogenesis in 8 percent of cases, the remaining 82 percent showed normal spermatogenesis[20]. Shah et al. reviewed 50 cases of Ambulatory hydrocoele surgery in 1992[21].

In 1995 a study done by Gunaydin G et al., indicated that fluids within spermatocoeles and epididymal cyst do not become infected under normal circumstances[22].

Recently Lavelle MA described surgical treatment of cystic swellings of the scrotum under local anaesthesia[5]

Mallace A.F suggested that Hydrocoele was the result of lymphatic obstruction either due to low-grade inflammation of the epididymis or due to trauma to the scrotum.

2. EMBRYOLOGY

- Development of scrotum.
- Development of testis, epididymis and vas deferens.

Development of Scrotum

It develops from the fusion of paired swellings on the anterior abdominal wall and therefore presents a median raphe, which is continuous with the ventral raphe of the penis. At this raphe the skin of the scrotum is continuous from one side to the other and so is the superficial fascia and the dartos. The dartos from its deep surface sends a septum in to separate the scrotal sacs. Into each of these sacs descends an outpouching of the abdominal wall, the inguinal bursa. Each inguinal bursa is intimately related to the testes and often after the descent of the testes the two descend further into the scrotum.

Development of Testes, epididymis and Vas deferens

Each testes develops from the coelomic epithelium that covers the medial side of mesonephros. This is indicated by the appearance of an area of thickened germinal epithelium on the medial side of mesonephric ridge in the 5th week. This thickening is known as genital or gonadal ridge. Upto the 7th week the gonad has no

differentiating feature. Then the rapidly proliferating germinal epithelium forms a number of solid gonadal or sex cords, separated by mesenchyme. These cords remain at the periphery of the primordium to form a cortex and in the centre proliferation of the mesenchyme of mesonephros constitutes medulla

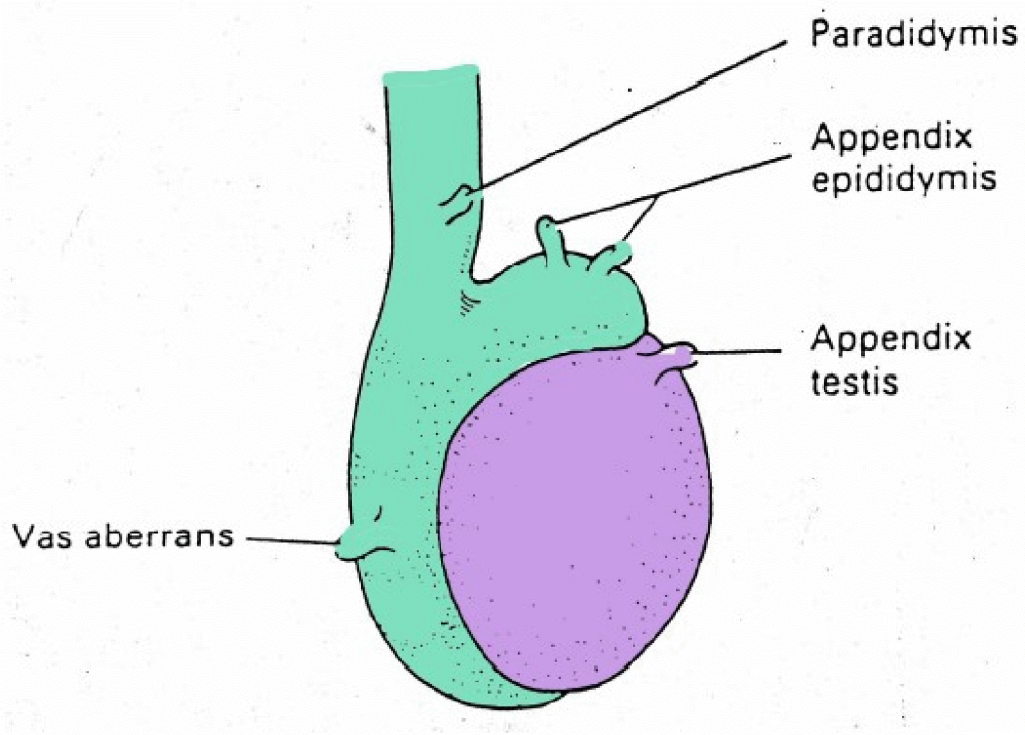
The cellular cords encroach on the medulla, where they unite with the network derived from the mesenchyme, which ultimately becomes testicular site. With the incorporation of primordial germ cells into the cords and canalisation, seminiferous tubules are formed. The cords that are not canalized form the interstitial cells of testes, some of which are also derived from the surrounding mesenchyme. The cells derived from the surface of gonad from the supporting cells of sertoli. These tubules remain solid until 5th to 6th month.

The mesenchymal cells surrounding the developing testes, form a dense fibrous layer called the tunica albuginea. The Leydig cells are seen by the 3rd month. Between 8th and 11th week the testes shortens and broadens. The rete testes become connected to the mesonephric duct by the 5-12 most cranial persisting mesonephric tubules. These become highly coiled to form the lobules of the head of epididymis.

The distal part of the mesonephric duct becomes the Vas deferens.

VESTIGIAL STRUCTURES IN THE REGION OF TESTIS

1) Appendix of testis (Hydatid of Morgagni) : This is the persistent part of the cranial end of the paramesonephric duct, attached to the testies.
2) Appendix of Epididymis : This represents the cranial end of the mesonephric duct, attached to the head of the epididymis.



APPENDAGES OF TESTIS

3) Superior aberrant ductules : They lie cranial to the vas and are connected to the testis.

4) Inferior aberrant ductules : they lie caudal to the vas and are connected to the epididymis.

5) Paradidymis (organ of Giraldes) : Consists of tubules that lie between the testis and epididymis, not connected to either of them.

3. ANATOMY OF SCROTUM AND ITS CONTENTS

Scrotum

The scrotal pouch is situated below the penis and pubic symphysis containing the testes, epididymis and lower portions of the spermatic cord. It is divided into two sacs by a partial median raphe or septum which continues into the perineal skin posteriorly and anteriorly along the ventral lower aspect of the penis. The homologue of this raphe in females remains separated to form the labia majora.

The scrotal sac consists of

(i) Skin,

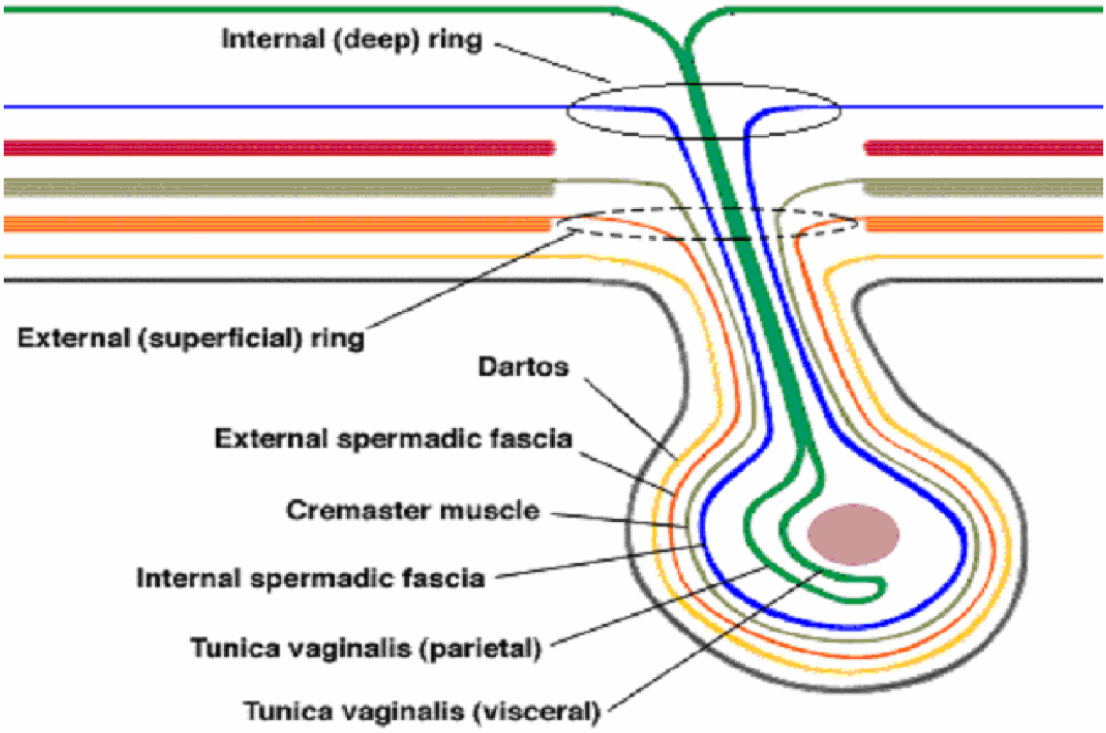
(ii) Dartos muscle- replaces the superficial fat and colle's fascia,

(iii) External spermatic fascia,

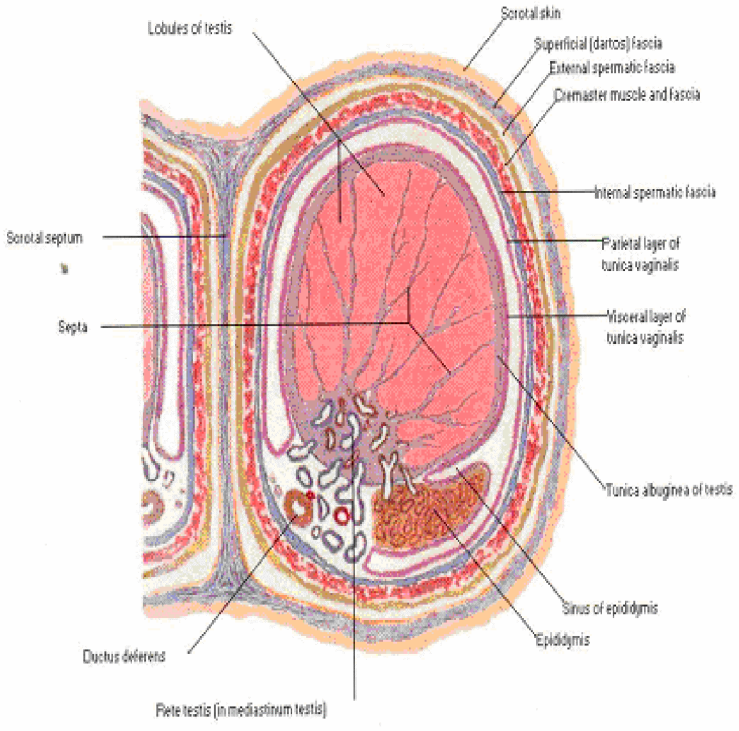
(iv) Cremastric muscle and fascia,

(v) Internal spermatic fascia and

(vi) Tunica vaginalis.



COVERINGS OF SPERMATIC CORD AND TESTIS



TRANSVERSE SECTION SHOWING COVERINGS OF TESTIS AND EPIDIDYMIS

The Scrotal Skin

The scrotal skin is thin, semitransparent, distensible and darker than surrounding skin. The skin is rich in sebaceous glands, bears thinly scattered crisp hairs, their roots visible through the skin whose secretion has a characteristic odour and also numerous sweat glands, pigmented cells and nerve endings responding to the mechanical stimulation of the hairs and skin and to variations of temperature. It lacks the subcutaneous adipose tissues.

The Dartos Muscle

Just beneath the skin is the dartos muscle, a smooth muscle embedded in loose areolar tissue consisting of elastic fibers and connective tissue, which permits the testes, the epididymis and the spermatic cord to move freely beneath the skin. The dartos muscle responds to changes in the temperature or following sexual excitation by contracting or relaxing accordingly. In cold environments it contracts and gives the wrinkle appearance to the scrotal skin. In warm environment it relaxes. This action helps in maintaining a steady range of temperature for testicular spermatogenesis, which occurs at a temperature few degrees below the normal body temperature. Dartos is supplied by sympathetic fibres carried from the perineal branch of S4. The loose areolar tissue has numerous small vessels, which should be carefully ligated to prevent post-operative haematoma formation. Also this layer has rich network lymphatics which drain into the medial group of inguinal lymphnodes.

The External Spermatic Fascia

External spermatic fascia is a continuation of the external oblique aponeurosis.

Cremastric Fascia

A few fibres from the internal oblique muscles form the cremasteric muscle. The loop like fibres of cremastic fascia forms a partial investment for the testes and spermatic cord. The fibres are fused to the parietal layer of the tunica vaginalis along with the internal spermatic fascia, a continuation of the transversalis fascia. Contraction of this musculo-fibrous layer draws the testes into the sub-inguinal pouch and protects it from injury.

The Internal Spermatic Fascia

It is a thin, loose layer around the spermatic cord, derived from the transversalis fascia.

Tunica vaginalis

Tunica vaginalis of testes are a serous cavity derived from the vaginal process of peritoneum but cut-off from it by obliteration of the processus vaginalis. It provides a covering for most of the testes and epididymis. It has a visceral and parietal layer with a potential space in between. The visceral layer is firmly adherent to the tunica albuginea of the testes and dips between the upper part of the testes and epididymis forming a pouch called the sinus of epdidymis. The visceral layer extends upwards for a short distance along with the spermatic cord. The parietal layer is separated from the scrotum by a fine layer of extravaginal cellular tissue.

Cremastric reflex

On tickling and scratching the medial aspect of the thigh, the cremaster contracts. This is mediated by the S1 root.

Blood Supply

The anterior scrotum derives its blood supply from the external pudendal artery, which is a branch of the femoral artery. Posterior scrotum is supplied by branches of internal pudenda artery with additional supply from testicular and cremastric arteries traversing the cord. Venous drainage is to the femoral vein.

Nerve Supply

The anterior scrotum wall (1/3) is supplied by ilio-inguinal and genitofemoral nerves and posterior scrotal wall (2/3) by posterior scrotal branches of perineal division of pudendal nerve. Scrotal skin is also innervated by posterior femoral cutaneous nerve branches.

Lymphatic drainage

The scrotal lymphatics do not accompany pudendal vessels and have no connection with testicular lymphatics. The lymphatics from both halves of scrotum anastomose freely and drain to the medial group of superficial inguinal nodes.

TESTES

The testes are the male reproductive organs. They are bilateral, ovoid, glandular structures measuring 4 to 5 cm in length and 2-3 cm in thickness. Testes has two surfaces lateral and medial surfaces, 2 borders- anterior and posterior and 2 ends upper and lower, each testes weighs 10-15gms.

They lie within the scrotal sac, suspended by the spermatic cords. They are attached to the base of the scrotum by scrotal ligaments. The left testes lies lower than the right normally. The normal testes are smooth, firm and elastic.

Covering of Testes

1. Visceral layer of tunica vaginalis
2. Tunica albuginea
3. Tunica vasculosa

1. The visceral layer of tunica vaginalis is derived from peritoneum, it covers the testes completely except for small part posteriorly near hilum where it is attached to the epididymis and spermatic cord and where the testicular vessels enter and leave the testes and vas deferens passes upwards.

2. The tunica albuginea is a pearly white fibrous layer (capsule) surrounding the testes and epididymis. From the deeper aspect of this layer numerous fibrous septa pass radially backwards dividing the testes into various compartments. These compartments converge towards the upper pole at the mediastinum region, which contains the rete testes.

The septae divide the testes into 400 or more lobules each of which contains two or more highly convoluted seminiferous tubules, which may be upto 2 ft when stretched. From the epithelial lining of these tubules spermatozoa are produced.

The seminiferous tubules converge towards the rete testes where they are connected by straight tubular recti, which join to open into the head of epididymis. Straight tubular lining elements mainly consist of sertoli cells, which play a minor part in spermatogenesis. The specialized cells of Leydig elaborate androgens mainly testosterone.

3. Tunica vasculosa -contains plexus of blood vessels in loose areolar tissue.

Histology

The testes are divided into numerous (250-400) lobules by septa arising from the deeper aspect of tunica albuginea. The ducts of these lobules coverage at mediastinum of testes connecting with 12 to 20 efferent ductules that drains into globus major. The seminiferous tubule has basement membrane lined by two types of cells, viz., the supporting cells of sertoli and the spermatogenic cells. The stroma between the seminifeours tubules has connective tissue containing Leydig cells.

Blood Supply

Because of common embryologic origin, the blood supply of testes, like that of kidneys is derived from aorta from just below the renal vessels (testicular arteries). The testicular arteries traverse through the spermatic cord to the testes, where they anastomose with cremastric arteries and artery to vas and thus supply the testes. Thus even after division of testicular artery, vascularity just enough to maintain viability of testes remains.

Venous drainage

The veins from the testes form the pampiniform plexus which passes upwards along the spermatic cord. At the level of the deep inguinal ring the veins unite to form a single testicular vein. One the right side the testicular vein drains into the inferior vena cava and on the left side to the left renal vein.

The entry of left testicular vein into the left renal vein is at a right angle and there is no valve at this region. Hence, increased hydrostatic pressure of obstruction may result in dilatation of the pampinform plexus of veins producing varicocoele, which usually occurs on left side. The other anatomical reasons attributed to this are

(a) Descending colon overlying left testicular vein.

(b) The left renal vein passes anterior to the aorta and posterior to the superior mesenteric artery. The angle between these two arteries may from a compressive 'nutcracker' effect.

(c) The left common iliac veins are transmitted to the pampiniform plexus through the veins of vas deferens.

Lymphatic drainage

The testicular lymphatics pass along the spermatic cord and inguinal canal into the common iliac and paraaortic nodes. The periaortic nodes have communications with those of opposite side, the mediastinal nodes and the left supraclavicular nodes. In men periaortic nodes extend from the level of T11 to L4 vertebra.

Nerve supply

Testicular nerves are derived from the aortic and renal sympathetic plexus. Any injury to the testes shall cause abdominal pain as a presenting feature and similarly certain intrabdominal disease do cause referring pain to the testes.

EPIDIDYMIS

It is a crescent shaped organ lying near the posterior border of the testes. It is coiled structure, which may be 12-19 feet long.

It is divided into 3 segments

1. Head- globus major
2. Body
3. Tail- globus minor

The head is situated at the upper pole of testes, on its posterior aspect. The body and tail are a single tube, with the tail attached to inferior extremity of the testes. Most of the epididymis is covered by the tunica vaginalis except near the hilum where

the vas deferens begins and vessels enter the testes. This forms a pouch or a slit called the sinus of epididymis or digital fossae. It is attached to the posterolateral surface of testes by 12-20 efferent ductules, which become convoluted and enlarge which together form the head of epididymis. Each lobule consists of a single convoluted duct, 15-20 cm long all of which open into the duct of epididymis with complex convolutions, forming body of the epididymis. It increases in diameter and thickness as it approaches the tail of epididymis where it becomes vas deferens.

Histology

Epididymis is lined by pseudostratified columnar epithelium with microvilli protruding into the lumen (stercocilia).

Blood supply

The medial surface of each epididymis attaches to the terminal portions of the spermatic cord through which it receives blood vessels, lymphatics and nerves. The arterial supply is mainly from the testicular artery and few branches from the artery of vas.

Nerve supply

Sympathetic fibers of celiac ganglion via drainage along the testicular lymphatics.

Function

Storage and maturation of the spermatozoa.

VAS DEFERENS

This is thick cord like muscular tube about 18 inch long and 2-3mm in its diameter. Because of its thick musculature it is easily palpated through the tissues of

the cord and scrotum. It is related anteriorly to the spermatic veins surrounding the testicular artery and the remnants of processus vaginalis. It has two parts:

- Straight portion: from the upper extremity of the testes to the ejaculatory duct.
- Convoluted portion: formed at the lower extremity formed by the joining of straight portion epididymal tubules.

Except for the arterial supply, which is derived from the artery to vas deferens branch of the umbilical or internal iliac artery, venous drainage and lymphatic drainage are similar to that of testes.

Function

Transport of spermatozoa to the ejaculatory ducts.

SPERMATIC CORD AND ITS COVERING STRUCTURES

The spermatic cord suspends the testes and the epididymis in the scrotum, extending from the deep inguinal ring to the posterior border of testes. The cord traverses the inguinal canal, having the walls of the canal as its boundary and ilioinguinal nerve in the floor of the canal. In passing through the canal it acquires coverings from the layers of the abdominal wall.

Contents

Vas deferens, internal and external spermatic fascia, the pampiniform plexus of veins, testicular and epididymal hypogastric plexus branches.

Blood Supply

From testicular artery, artery to ductus deferens and cremastric artery. The venous return is by cremastric vein into inferior epigastric vein.

Lymphatic Drainage

The lymphatics from the coverings of the cord drain into the external iliac group of lymph nodes.

4. PHYSIOLOGICAL CONSIDERATION[22]

Tunica vaginalis is an invaginated serous sac and like any other serous cavity of the body, it has a visceral and parietal layer. These two layers are separated by a potential cavity. The opposed surfaces are smooth and glistening. The cavity contains a thin layer of fluid to reduce friction. The living membrane is composed of a single layer of flattened endothelial cells supported by delicate areolar tissue. It forms a smooth glistening surface, apt to perform the function of preventing injury to the testes, by constant rubbing with the medial aspect of the thigh. The fluid in the tunica vaginalis is kept in balance by the osmotic pressure and the colloid osmotic pressure of the blood. An increase in the capillary blood pressure or damage to the endothelium increases the amount of fluid in the sac. Normally fluid from the sac is drained by the lymphatics in the parietal layer of the sac, as there are no or few lymphatics in the subserosa over the testes and the epididymis, Any hindrance with this normal mechanism either in the form of increased production or decreased absorption leads to the formation of hydrocoele.

5. CLASSIFICATIONS AND AETIOPATHOLOGY OF CYSTIC SWELLINGS OF SCROTUM

1. Anatomical classification.
2. Aetiological classification.
3. Clinical classification.

1. Anatomical classification

a. Swellings from skin and subcutaneous tissue

- Sebaceous cyst
- Scrotal wall abscess

b. Swellings from tunica Vaginalis

- Primary vaginal hydrocoele
- Congenital hydrocoele
- Infantile hydrocoele
- Bilocular hydrocoele
- Haematocoele
- Pyocoele
- Chylocoele and
- Secondary hydrocoele

c. From the tunica albuginea (Very rare)

- Tunica albuginea cysts

d. From the testis

- Simple testicular cysts
- Intratesticular epidermoid cysts
- Cystic dysplasia
- Dermoid cysts
- Cyst of appendage of testis

e. From the epididymis

- Epididymal cysts
- Spermatocele

f. From the processus vaginalis and spermatic cord

- Encysted hydrocele of the cord
- Funicular hydrocele
- Hydrocele of the hernial sac
- Lymphavarix

2. Aetiological Classification

a. Primary or idiopathic

- Primary vaginal hydrocoele
- Infantile hydrocoele
- Encysted hydrocoele of the cord
- Funicular hydrocoele
- Hydrocoele enbiasac
- Tunica albuginea cyst
- Cyst of appendage of testis
- Epididymal cysts

b. Secondary or acquired

- Haematocoele
- Pyocoele
- Chylocoele
- Secondary hydrocoele
- Simple testicular cysts
- Intratesticular epidermoid cyst
- Dermoid cyst
- Spermatocoele
- Lymph varix

- Hydrocele of hernial sac

3. Clinical Classification

a. Translucent & Non-translucent

1. Translucent
    - Primary vaginal hydrocoele
    - Infantile hydrocoele
    - Congenital hydrocoele
    - Spermatocoele
2. Non-translucent
    - Haematocoele
    - Pyocoele
    - Filarial hydrocoele
    - Chylocoele

b. Symptomatic and Asymnptomatic

1. Symptomatic –
    - Scrotal wall abscess
    - Acute epididymo orchitis
    - Torsion
2. Asymptomatic –
    - Primary hydrocoele
    - Epididymal cyst
    - Spermatocoele
    - Tumours

HYDROCOELE

Hydrocoele is an abnormal collection of serous fluid in some part of the processus vaginalis, usually the tunica[1]. It is the commonest cause of cystic swellings of scrotum occurring in various age groups. Basically it is of simple (scrotal) and communicating[2].

Classification of Hydrocoele

1. Aetiological Classification
    a. Congenital- congenital hydrocoele
    b. Acquired
        i. Primary or Idiopathic
            - Primary vaginal hydrocoele
            - Infantile hydrocoele
            - Encysted hydrocoele of the cord
        ii. Secondary (secondary to the diseases of testes, epididymis and cord)
            - Acute or Chronic epididymorchitis
            - Tuberculosis
            - Filariasis
            - Syphilis
            - Gonococcal infection
            - Testicular tumors
            - Trauma
                a. Testicular torsion
                b. Operative- post varicocoelectomy, post hernia repair

2. Anatomical classification
    a. Primary vaginal hydrocoele
    b. Congenital hydrocoele
    c. Infantile hydrocoele
    d. Funicular hydrocoele
    e. Encysted hydrocoele of cord
    f. Abdominoscrotal hydrocoele
    g. Hydrocoele of hernial sac
    h. Hydrocoele of the testes
    i. Diffuse hydrocoele of the cord
3. Clinical classification
    a. Transilluminant- primary vaginal hydrocoele
    b. Non-transilluminant- secondary hydrocoele

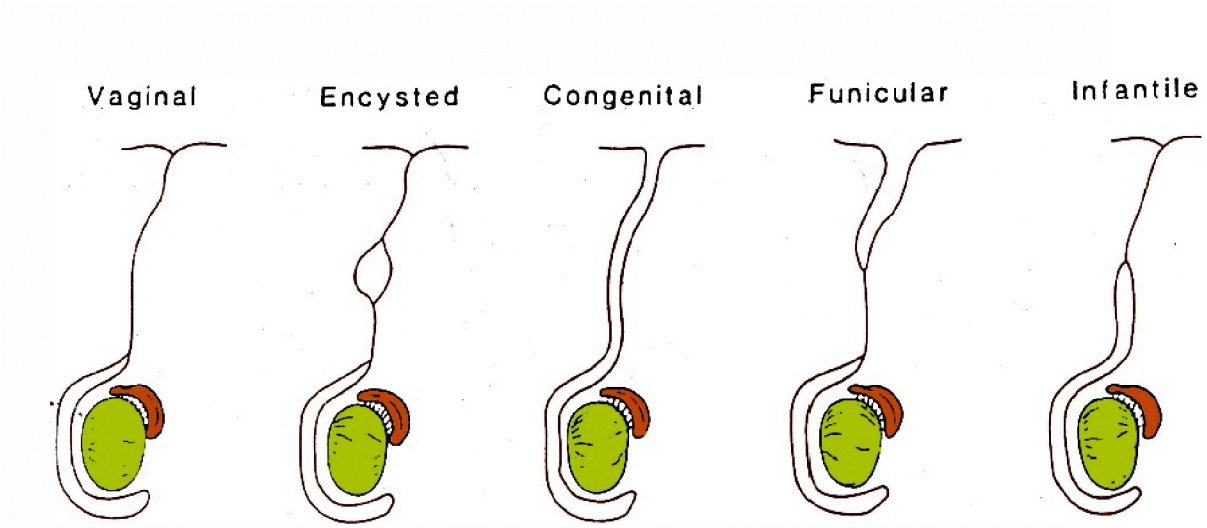


FIGURE- DIFFERENT TYPES OF HYDROCELE

1. Vaginal hydrocoele

Primary vaginal hydrocoele is an abnormal collection of serous fluid in the tunica vaginalis. It is further classified into

a. Vaginal hydrocoele per se
b. Bilocular hydrocoele
c. Hourglass hydrocoele
d. Multilocular hydrocoele

This is the commonest cause of scrotal swelling and occurs in men of all age groups, usually middle or elderly age groups common in tropical countries. Presents with painless scrotal swelling, sometimes they attain very large size about 5% of inguinal hernias are associated with vaginal hydrocoele on the same side.

The fluid accumulates slowly without pain and a dragging sensation is felt in the groin. It may involve only one side or both sides, being slightly more frequent on the right side. The upper pole can be palpated at or just below the external inguinal ring. In large ones the tunica vaginalis may be so tensely distended that the testis cannot be identified. The scrotal skin is tense and shiny.

In a very large hydrocele especially when bilateral the penis may be with drawn in to the distended scrotal skin and its position is marked by a puckered dimple. The penis appears to be shortened as the hydrocele enlarges and extends upwards into the scrotum as opposed to carcinoma of the testis in which the penis appears larger. It transilluminates light held against scrotal wall.

2. Congenital Hydrocoele

This type of hydrocoele the processus vaginalis remains patent through the entire length and communicated with the peritoneal cavity. Ian Aird described it as 'communicating' while Brownie (1952) called it 'fluid inguinal hernia'. The one characteristic finding here is the fluid goes back into the abdominal cavity at night, but when we try to reduce it, it cannot be emptied. This is due to an "Inverted ink bottle effect" at the internal ring. In bilateral cases ascitis or ascitic tubercular peritonitis should be suspected.

3. Infantile Hydrocoele

This is a misnomer, It does not necessarily appear in infant. In this condition the tunica and the processus vaginalis are distended up to the deep inguinal ring but do not communicate with the general peritoneal cavity, it can occur at any age.

4. Funicular Hydrocoele

In this condition the processus vaginalis remains patent up to the top of the testis, where it is shut off from the tunica vaginalis. The swelling is inguinal, rather than scrotal. Testis can be felt separately, other features are similar to this of congenital hydrocele.

5. Encysted Hydrocoele of the cord

This is a smooth, oval cystic swelling along the spermatic cord situated either in the inguinal or the inguinoscrotal region and felt separate from the testis. It is mobile transversely and with traction of testis descends down and becomes less mobile. Here the processus vaginalis is obliterated both near the testis and the peritoneal cavity with the remaining part situated in between.

6. Hydrocoele of the hernial sac

This is formed when hernial sac which was communicating is closed by the adhesion of contents of hernial sac at the neck or the mouth, of plugging of contents usually the omentum at the mouth of hernial sac. Resultant fluid secreated collects distal to the neck causing a hydrocoele.

7. Hydrocele of the Canal of Nuck

It is a swelling situated in the inguinal region in females. The cyst is in relation to the round ligament. It may stimulate incarcerated inguinal hernia. Although irreducible it is mobile in all directions, it is rarely painful. This seldom transmits light as the external oblique covers it.

8. AbdominoScrotal hydrocoele (hydrocoele en bissac / Bilocular hydrocoele)

This type of hydrocoele, the fluid accumulation extends though the inguinal canal into the abdomen. It is a rare condition. These are of three type- properitoneal , interstitial and retroperitoneal.

It is thought that abdominal component results from a large inguinoscrotal hydrocoele that is separated from peritoneal cavity by only a short obliterated segment at the internal ring. As fluid continue to accumulate, the hydrocoele expands into relatively low pressure of abdominal cavity to from abdominal component.

Hydrocoele in the inguinal canal extends into the internal ring will get nipped, everytime the patient strains by the normal slide valve mechanism of the canal. As the arching fibres of internal oblique and transverses muscle actively contracts to close the inguinal canal, a portion of the sac containing the fluid gets pinched like a fluid filled balloon, resulting in a forced expansion of the pinched portion around the

peritoneum since such a combination of cirucumstances is unlikely to be common. It explains the relatively uncommon occurrence.

It occurs as a result of pinching of the hydrocoele at the inguinal ring getting caught in the slide valve mechanism of the canal while staining. This is irrespective of the presence of a scrotal hydrocoele.

9. Hydrocoele of the testes

Localised accumulation of fluid under the tunica albuginea, has no communication to the tunica vaginalis.

Aetiopathogenesis of Hydrocoele

Hydrocoele are produced in four ways:

1. By excessive production of fluid within the sac, e.g. Secondary hydrocoele
2. By defective absorption of fluid by the tunica vaginalis, this is the pathogenesis being explained for most primary hydrocoele, although the reason is still obscure. Damage to the endothelial wall by low-grade infection seems to be the probable explanation.
3. By interference with lymphatic drainage of scrotal structures.
4. By connection with a hernia sac , as in congenital hydrocoele.

PRIMARY OR IDOPATHIC HYDROCELE

When there is no definite cause to account the production of hydrocele then it is known as primary or idiopathic hydrocele.

Three possibilities can be considered as the cause

1. Nervous
2. Vascular
3. Lymphatics

Increased nervous stimulation would probably lead to excessive endothelial secretion (as would increase vascularity) but not of sufficient amount to produce a hydrocele. Most authors are satisfied with a simple explanation such as "*an imbalance between accumulation and resorption of fluid within the tunica and vaginalis*" the imbalance is primarily a resorptive impairment as proven by ozdilek who injected indigo carmine into the sac in the patients with hydrocele and compared the resorptive time with that of controls in producing renal excretion of the dye[15]. Wallace reviewed the historical and contemporary ideas on the subject and concluded, "it was the result of lymphatics obstruction and that the two most probable underlying causes were a low grade inflammatory lesion of the epididymis and trauma to the scrotum"

Rinker and Allen convincingly demonstrated the scarcity and absence of lymphatics in the parietal layer of the sac of hydrocoele in contrast with the abundance of lymphatics in the normal vaginal sac.[23] It is not known how this lymphatics system is destroyed to cause hydrocoele. It is presumed to be due to non-specific inflammation of the epididymis or testis involving tunica vaginalis. This inflammation may be chronic from the beginning or an acute or subacute inflammation or congenital absence of lymphatics or hypoplasia of lumphatics, which becomes chronic.

SECONDARY HYDROCELE

When there is a definitive cause to the development of hydrocoele this type of hydrocoele is called secondary hydrocoele. This type of hydroocele is predominantly of exudative type.

It is believed to be due to excessive production of fluid within the sac and is of usually short duration and small size. The fluid may be serosanguinous if there is an underline tumour.

Secondary hydrocoele are secondary to-

1. Bacterial infection- Gonococcal epididymorchitis was earlier common before the antibiotic era. However these types are less owing to antibiotic usage. But gonococcal epididymitis is still prevalent1.
2. Viral infection- Mumps, rare cause for secondary hydrocoele.
3. Tuberculosis- Epididymorchitis of tubercular origin do present with accumulation of fluid in tunica vaginalis. The epididymis major is beaded, nodular and thickening of the epididymis.
4. Filarial infection- This infection predominant in tropical countries forms the most common cause for hydrocoele – chylocoele, accounting to 80% of the hydrocoele. In most of the cases microfilaria is not demonstrated in the fluid of the hydrocoele, but a milky fluid or sediment rich hydrocoele fluid suggest a filarial origin[2]. Hydrocoele follows a repeated attack for filarial funiculitis and develops rapidly or gradually and can be large or small, frequently they are bilateral. The presence of chyle is the proof of positive filarial origin, and presence of cholesterol and calcium deposits. Adult worm Wuchereria Bancrofti have been found in the epididymis removed by operation. Filarial elephantiasis of scrotum may supervene in a small proportion of cases.
5. Testicular malignancy- Secondary hydrocoele is present in 10% of testicular tumors. Hydrocoele is usually small, typical of secondary hydrocoele; underlying neoplasm may or may not be palpable.

6. Post Herniorrhappy hydrocoele- It appears after an operation for inguinal hernia in 0.2% of cases probably due to damage to lymphatic vessels of tunica vaginalis, which pass to the testes and spermatic cord.
7. Post varicocoelectomy- Most common complication of varicocoele surgery- explained as damage to lymphatics of the cord causing hydrocoele.
8. Hydrocoele of hernial sac- Neck or the mouth of hernia been plugged or obstructed by the content causing accumulation of fluid resulting in collection of fluid causing hydrocoele.
9. Post trauma- direct trauma to the testes.
10. Malignant mesothelioma of the testicular tunica vaginalis presenting as hydrocoele[24].
11. Primary testicular osteosarcoma with hydrocoele[25].

Differences between primary and secondary hydrocele

	Primary Vaginal Hydrocele	**Secondary Hydrocele**
Aetiology	Defective absorption of fluid	Excessive production of fluid
Duration	Long	Short
Size	Moderate, big	Small
Associated systemic Symptoms	Absent	Present
Bilaterality	Possible	Occasional
Tenderness on Examination	Absent	May be present
Cord	Normal	May be thickened
Consistency	Tensely, cystic	Lax, Cystic
Testis and epididymis	Not palpable separately	Can be palpated separately
Hydrocele fluid	Straw or amber colored	Opaque
Transillumination	Positive	Negative

Hydrocoele Fluid

Fluid is serous, fluid accumulation varies to the chronicity of the condition. In acute it is moderate in amount, collects rapidly and is turbid. It contains flakes, fibrin and leucocytes. In chronic cases, fluid slowly produces enormous distension of the sac, it is thin clear and watery to yellow in colour, odourless. Specific gravity from 1.22 to 1.024 contains inorganic salts, cholesterol and fibrinogen and albumin.

Presence of fibrinogen causes the fluid not to clot when collected, but a few drops of blood stirred into large quantity of hydrocoele results in firm clotting. Filarial hydrocoele fluid is rich in cholesterol and calcium, specific gravity from 1.030 to 1.050, microfilaria may or may not be demonstrated in the fluid. The fluid analysis results from the studies show it is a transudate in most of the hydrocoele than exudate unless it is secondary hydrocoele.

Effect on Sac :

The tunica vaginalis (sac) may be thin and thick, depending on the concentration of fluid (acute or chronic). In cases of long standing and especially in those which have been subjected to repeated tapping. An extra ordinary thickening may occur. The wall may become hard as cartilage and calcareous plates may be deposited in it. Fibrinous adhesions may cause partial obliteration of the sac and may divide it into compartments.

Microscopic exasmination of the sac may show chronic inflammatory changes of different degrees of severity in thick walled sacs. Focal or diffuse and perivascular round cell infiltration may be present. More severe lesions may be found in sacs of filarial hydrocele and eosinophilic infiltration may be seen.

Effect on the Epididymis

The epididymis is hardly normal. It is chronically inflamed luster of its surface is lost. It is hypertrophic or atrophic or indurated and sclerotic. The appearance of epididymis is important from the point of etiology and it is supposed that.

Effect on the Testis

Long standing hydrocoele causes pressure on the testes, causing flattening or atrophy of the testes. Atrophy is also contributed by the decrease in blood supply to the testes.

Dey, observed an arrest of spermatogenesis and consequent testicular atrophy as a result of fluid pressure in the tunica vaginalis. Arrest of spermatogenesis may also be caused by pressure on the blood supply of the testes from odema within a tight fibrous sheath enclosing the tunica vaginalis[26].

M.C. Dandapat et al., observed that arrest of spermatogenesis was apparently caused by large quantity of fluid under tension, such an arrest might be due to increase in the scrotal temperature, retarding spermatogenesis.[20]

CYSTS IN CONNECTION WITH EPIDIYMIS

Two types-

1. Degenerative cyst- Epididymal cyst.
2. Retention cyst- Spermatocoele.

1. Degeneration cyst- Epididymal cyst

Epididymal cyst occurs due to cystic degeneration of the paradidymis, appendix of epididymis, appendix of testes, vas abberans. These are found most in middle-aged patients. These are usually a multilocular cyst and ability to attain a large size. It can be inside or outside the tunica vaginalis, between the body of the testes and head epididymis. Patients with Von-Hippel-Lindau disease have an increased incidence of this condition, also with offspring of women treated with Diethyl Stilbesterol (Vohra and Morgentaler, 1997)[2].

2. Retention cyst- Spermatocoele

Spermatocoele is a retentions cyst arising from either the vasa efferentia of the testes or from the epididymis. It's the unilocular cyst, epdidiymal equivalent of the berry aneurysm.[2] It contains white opalescent (barley white) fluid with spermatozoa. Presentation is asymptomatic most of times, detected incidentally in upto 30% on ultrasonography. The exact etiology is not known. Infection and inflammation have been postulated as factors in its genesis[27]. The relatively high potassium and chloride content may be derived from secretory products of the proximal seminal system, from the spermatozoa or from the epithelial lining of the spermatocoele. Stagnation of sperm within spermatocoele occasionally leads to antisperm antibodies formation and excision will eliminated these antibodies.[2]

TESTICULAR CYSTS [28]

Testicular cysts are discovered incidentally on ultrasound in 8% to 10% of the population. Cystic testicular lesions are not uniformly benign, because testicular tumours may undergo cystic degeneration because of hemorrhage or necrosis. The

differentiation between a benign cyst and a cystic neoplasm is of utmost clinical importance.

Teratomas are most common tumours to undergo cystic changes. Teratomas are usually multiple and vary in size. Solid components are often seen in association with the cystic masses.

There are two types of benign cyst :

Cysts of the tunica albuginea and Intratesticular cyst.

Cysts of tunica albuginea are located with in the tunica, usually on the anterior and lateral aspect of the testis.

They vary in size from 2 to 5mm and are well defined. They may be solitary or multiple, unilocular or multilocular. They are discovered in patients in their fifth and sixth decades and are commonly asymptomatic. Histologically, they are simple cysts lined with cuboid or low columnar cells and filled with serous fluid. Their etiology is unknown.

Intratesticular cyst are simple cysts filled with clear serous fluid that very in size between 2 and 18mm. They have sonographic characteristics of benign simple cysts occurring in other organs, they are well defined, anechoic lesions with thin, smooth walls and posterior acoustic enhancement. Hamm et. al. reported that in all 13 of their cases, the cysts were located near the mediastinum testis, supporting the theory that they originate from the rete testis, possibly secondary to post traumatic or post inflammatory stricture formation.

Epidermoid cysts

Epidermoid cysts of the testis usually present between the second and fourth decades. They are usually asymptomatic and discovered incidentally. These tumours are round, firm, sharply demarcated on gross examination. Microscopically, the cyst is lined with stratified squamous epithelium. The adjacent testicular parenchyma is benign the histogenesis of these tumours is uncertain. The clinical behaviour of these tumours is benign patient usually presents with a painless testicular nodule. Although one third are discovered incidentally on physical examination.

Diffuse painless testicular enlargement occur's in 10% of cases. These lesions are generally well circumscribed tumours lying beneath the tunica albuginea. The cyst is filled with flaky, cheesy white keratin. Epidermoid cysts are believed to represent monomorphic or monodermal development of a teratoma along the line of ectodermal cell differentiation. These benign lesions can only be differentiated from pre-malignant teratomas through histologic examination. By definition, epidermoid cyst contain no teratomatous elements, and thus have no malignant potential.

Sonographically, epidermoid cysts are generally well defined solid hypoechoid masses. The mass typically has an echogenic capsule.

Cystic dysplasia :

Cystic dysplasia is a rare congenital malformation, usually occurring in infants and young children, although one case has been reported in a 30 years old man, only six cases have been described. This lesion is believed to result from an embryologic defect preventing connection of the tubules of the testis and the efferent ductules. Pathologically, the lesions consists of multiple, intercommunicating cysts of various sizes and shapes, separated by fibrous septae. This lesion originates in the rete testis

and extends into the adjacent parenchyma, resulting in pressure atrophy of the adjacent testicular parenchyma. The cysts are lined by single layer of flat or cuboidal epithelium of the reported six patients, two had ipsilateral renal agenesis and one had bilateral renal dysplasia[29].

Treatment :

Benign cysts are treated by local excision (enucleation) with conservative testicle sparing approach. Malignant cysts are treated by orchidectomy.

SPERMATOCOELE SAC

The histological appearance of a spermatocoele sac is in many respects similar to that of a hydrocoele sac. Recovery of sperm from the fluid is conclusive differential feature. The sac is lined by cuboidal epithelium, surrounding this is a well defined envelope consisting of tightly opposed coarse plated or bands of collagen and spindle cells enmeshed in elastic fibers, external to this is much looser areolar tissue in which occasional bundles of smooth muscles are found[27].

HAEMATOCOELE

Haematocoele is a collection of blood within the tunica vaginalis[30]. Usually to trauma or bleed from an underlying malignancy. The swelling is nontransilluminant and tender. As the clots contracts it forms a hard mass surrounding the testes.

Acute Haematocoele

Patient presenting with blunt injury to the scrotum, with vague discomfort of the testes, followed by pain and rapid swelling of the testes. On examination a tense tender and fluctuant swelling which in nontransilluminant is found. The testes may or may not be palpated separately.

Chronic Haematocoele

This usually follows an acute injury to the scrotum, which was neglected or post operative- post varicocelectomy or post hernia repair. The blood starts slowly accumulating in the tunica vaginalis later the blood gets clotted and forms hard mass, nontender surrounding the testes. At this stage there is loss of testicular sensation, non fluctuant.

Chronic haematocoele is indistinguishable from testicular tumour, gumma. Thus provides an early intervention to this diagnosis.

PYOCOELE

The hydrocoele if gets infected is said to have pyocoele. As with the infection these demonstrate local inflammatory signs and tender swelling.

SEBACEOUS CYST

Sebaceous cyst as such is common, but when in scrotum it is known to present with multiple cyst of the scrotal skin. Cyst contains putty like material of sebum, fat and desquamated epithelium. As in any other parts of body, sebaceous cyst can rupture; get infected to have recurrent infection of scrotal skin.

6. CLINICAL MANIFESTATIONS AND DIAGNOSIS

1. Primary Vaginal Hydrocoele

Commonest cause of scrotal swelling which presents in all age groups, however more in middle aged men. It present either unilateral or bilateral, side is not specific but more presentation are on right side, reason behind is not known. Patient present with swelling of scrotum may or may not present with pain. Swelling is pear shaped tapering towards the cord. One can get above swelling. Skin over the swelling

is normal, however the skin rugosity is lost which is the indicator for the swelling of that particular site in early stages when as such swelling is not appreciable. Swelling is non-tender. As the swelling is quite huge and covers whole of testes, testes are not palpable. Vaginal hydrocoele has been associated with hernia in 5% of cases, thus checking for impulse on coughing is a must test in examination. Penis is pushed to other side in case of unilateral huge hydrocoele. In case of bilateral huge disease the penis is buried partly. The penis appears shortened as the hydrocoele enlarges and extends upwards into the scrotum as opposed to carcinoma of the testes in which the penis appears larger.

On examination, a swelling in the scrotum, smooth surface, can get above the swelling, cystic in consistency- fluctuation test, transilluminant, in long standing cases this may not be possible. Testes are not palpable separately from swelling.

Condition in which transillumination is negative:

- Thick, Calcified sac
- Haematocoele
- Pyocoele
- Chylocoele

2. Congenital Hydrocoele

The patent processus vaginalis is the cause for this type of hydrocoele so much so enough to allow the peritoneal fluid to seep in, however not allowing the peritoneal structures. The hydrocoele freely communicates into peritoneal cavity. This is suspected when there is strong history of subsiding of swelling on lying down, which disappears gradually, to return by erect posture or external pressure. The opening

which is small prevents the swelling to reduce by digital reduction- as explained as 'inverted ink bottle' effect. This is sometimes associated with ascites or peritonitis.

3. Infantile hydrocoele

Presents as a swelling in the inguinoscrotal region, upto the deep inguinal ring, not able get above swelling. There is no impulse on coughing and swelling is irreducible. Testes are not palpable separately.

4. Funicular Hydrocoele

Swelling in the inguinoscrotal region extending from inguinal upto upper pole of testes. Testes are felt separately from swelling. Swelling disappears when patient is in supine position and reappears on erect posture.

5. Encysted hydrocoele of cord

Swelling in relation to the spermatic cord, smooth, oval, cystic, confining to the inguinal canal or to scrotum. Testes are felt separately. Traction test- when the testes are pulled down that side of swelling, the swelling becomes fixed, this is said positive.

6. Hydrocoele of Hernial Sac

Cystic inguinoscrotal swelling felt separately from testes, irreducible with no impulse on coughing, which was reducible earlier, swelling, is transilluminant. A strong history of reducible swelling turning to irreducible is important.

7. Secondary Hydrocoele

As the name caries is secondary to disease of testes, epididymis, spermatic cord. Patient presents with symptoms of primary disease, swelling, pain and vague discomfort. Secondary hydrocoele rarely attains a big size, lax; testes are palpable as

there is minimal fluid within the tunica. However additional findings of cord thickening, nodular, beading of cord or epididymis is found. Doubtful cases should usually follow ultrasonography of the scrotum to differentiate from primary hydrocoele. This type of hydrocoele subsides once the cause is treated.

A. Acute epididymorchitis

Infection is usually from the urethra, prostate and seminal vesicles which spread via lumen of vas deferens retrograde to reach testes. Presents with painful scrotum with or without swelling. On examination the testes and cord are tender. The epididymis is also tender. Some time it is associated with scrotal skin changes – redness and edema, commonest cause is chlamydial infection.

However gonococcal infection, E.coli, streptococcus, staphylococcus, proteus following catheterization.

B. Tuberculous epididymorhcitis

Tuberculous infection to the testes, epididymis or cord is through haematogenous spread, because of extensive blood supply to globus minor, this is the first part to get involved. Patient present with dull aching sensation on affected site, with or without a swelling. On examination, the globus minor is nodular and enlarged, later the whole of the epididymis thickened and firm craggy and tender.

This some time present as encysted cord following abscess formation- cold abscess. Later to burst open commonly on the posterior aspect of scrotal skin, as the relation of epididymis of testes placed posteriorly to form a sinus. 30% of this condition. May present with secondary hydrocele.

On examination of rectum, the seminal vesicles may be thickened and tender. To confirm the diagnosis, prostatic massage, brings out the urine or semen with the tubercle bacilli, to confirm the diagnosis.

C. Syphilitic Orchitis

Present as orchitis, interstitial fibrosis, gumma is the commonest of the three. It is painless. Testicular sensation is lost, secondary hydrocoele is almost always present. Testes later on softens and to open to scrotal skin anteriorly. Confirmed by serological tests.

D. Filarial Infection

Present as an epididymorchitis. Epididymis is swollen and tender. Testes are enlarged and certain extent testicular sensation is lost. Secondary hydrocoele is present. Features against tuberculous infection are absence of evening rise in temperature, seminal vesicle spared by rectal examination, eosinophilia and microfilaria in blood. Calcification of tunica is so rare in idiopathic that presence should suggest infection, especially filarial origin[2]. Lymph varix is the dilatation of spermatic lymph vessels, fever with periodicity and swelling of spermatic cord, multiloculated elongated cysts swelling of cord known as diffuse hydrocoele of the cord.

E. Testicular Tumours

Patient present with painless scrotal swelling, with dull aching pain, testes are enlarged, firm to hard in consistency, smooth to irregular surface and loss of testicular sensation. Secondary hydrocoele is present in 10% of testicular tumour[2]. Spermatic cord may be thickened due to cremastric hypertrophy, but the vas is not thickened.

8 . Epididymal cyst

Patient in middle age, presenting a swelling in the scrotum, unilateral or bilateral, with or without pain, separate from the testes. Arises from the epididymal head, situated in upper pole of testes and slightly posterior, testes are felt separately- reassuring sign.[1]

Tense cystic feel like bunch of tiny grapes. Fluctuation is positive. The cysts are filled with crystal clear fluid, thus highly transilluminant- classically explained Chinese Lantern pattern.

9. Spermatocoele

Patient present with scrotal swelling, usually small, occasionally may be big enough to make the patient feel that he posses three testicle. The swelling nearly always lies in the head of the epididymis above and behind upper pole of testes. Testes are felt separately from the swelling. Soft in consistency, transilluminates. Most of the spermatocoele is less than 1cm. Some may mimic a solid neoplasm when it's large and hard. Aspirate of the cyst yields barley water like fluid containing spermatozoa.

10. Haematocoele

In case of recent haematocoele, patient gives history of trauma to scrotum or some operative procedure. Present with pain and swelling with short history of swelling progressing. On examination it is tense tender and fluctuant, but nontransilluminant, testes are felt separately.

In case of old neglected haematocoele, which is clotted, presents with dull aching pain or without pain. On examination swelling is non tender, important feature is loss of testicular sensation.

11. Pyocoele

Hydrocoele getting infected to present with symptoms and signs of inflammation. Skin is erythematous and odematous, painful and tender, fluctuant and non-transilluminant. Lymph nodes are enlarged.

12. Sebaceous cyst

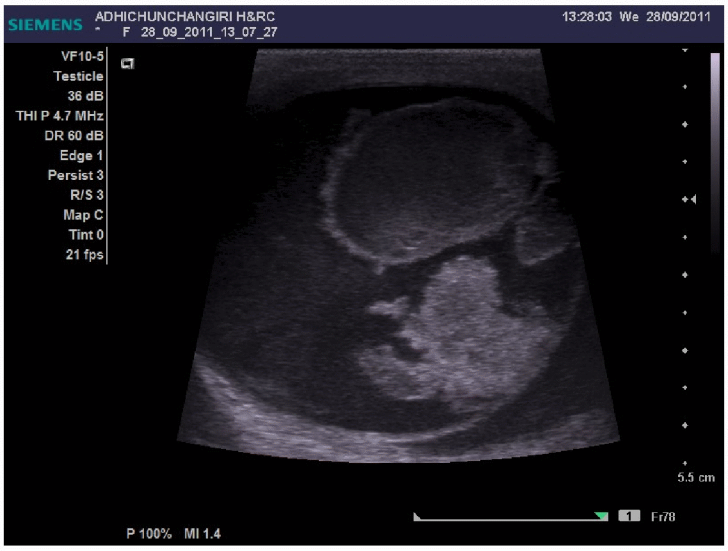
Scrotal skin is peculiar of presenting with multiple sebaceous cysts than other sites. On examination nontender, smooth swellings in scrotal skin, punctum may not be demonstrated all the time. Scrotal contents are normal.

Complications of Hydrocoele

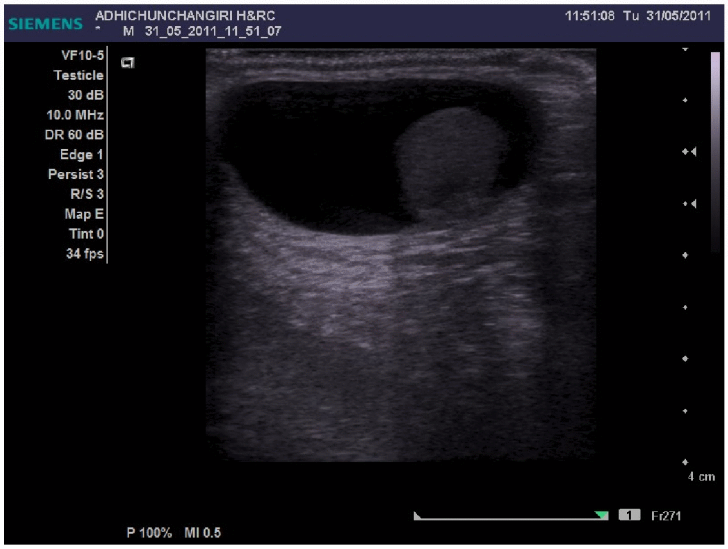
Huge hydrocoele causes inability to perform routine activities, hinder his work

1. Haemorrhage in to the hydrocoele sac, due to trauma or iatrogenic by aspiration or spontaneous.
2. Pyocoele-infection of hydrocoele fluid,
3. Rupture
4. Hernia of Hydrocoele sac, long standing cases may herniate through the scrotal skin
5. Calcification of hydrocoele sac wall.
6. Rare complications- atrophy of testes.

ULTRA SOUND IMAGES SHOWING EPIDIDYMAL CYST



ULTRA SOUND IMAGES SHOWING HAEMATOCOELE



ULTRA SOUND IMAGES SHOWING HYDRO COELE

ULTRASOUND IN EVALUATING SCROTAL SWELLING

Ultrasound help in whenever there is a diagnostic dilemma, as the diseases of the testes sometimes leads in salvaging the affected testes. Ultrasound is also the best imaging modality for follow-up[31].

Scrotal cystic swellings may be due to extratesticular and intratesticular. The majority of extratesticular lesions are benign while the majority of intratesticular lesions are malignant. Ultrasound is helpful in separating extra from intratesticular lesions. Ultrasound shows whether a mass is cystic, solid or complex, and also features such as associated calcifications, epididymal involvement, scrotal skin thickening and colour Doppler flow pattern.

Extratesticular lesions include hydrocoele, spermatocoele, epididymal cyst, hernia and tumors of epididymis and cord structures. Intratesticular lesions include primary tumor, metastases, lymphoma. Tuberculous epididymitis and epididymo-orchitis may also be demonstrate

Hydrocoele was the most common extratesticular lesion (29.87%) and epididymitis was the second most common (14.28%). Infection was the most common intratesticular pathology (54.17%) and tumor was the second most common intratesticular pathology (31.25%). Testicular tumors appeared as a focal mass while testicular infection usually caused a diffuse abnormal echogenicity throughout the testes. Epididymal lesion and skin thickening were usually detected along with intratesticular infection. Findings of solitary intratesticular mass without epididymal lesion or skin thickening preferred malignant entity[32,33,34]

7. PRINCIPLES AND METHODS OF TREATMENT

Principle in treatment of the cystic swellings of the scrotum is to drain the collected fluid and measures taken to prevent reaccumulation is case of primary hydrocoele. In case of secondary hydrocoele treat the cause, however many a time to treat the cause itself leads in removal of the diseased part.

Indications of treatment include pain, discomfort, cosmetic appearance or the patient's wish[4]

1. Treatment of Primary Vaginal Hydrocoele

Surgical and Non-surgical management-Aspiration, Aspiration and injecting Sclerosant

Non Surgical Management

a. Simple aspiration

Aspirating the fluid from the hydrocoele, which has to be repeated, carries the risk of infection and haematoma formation[5]. This procedure always carries recurrence within a week or so. It may be suitable for elderly man who are medically unfit for scrotal surgery[35].

Procedure:

The scrotal skin prepared as for an operation. Under strict asepsis, local anesthesia is not needed, 1% xylocaine using a syringe can be given if patient is not cooperative. Then lumbar puncture needle is used to aspirate, once confirmed of anesthesia and fluid is drained. Position of the testes are first confirmed whether anteverted or retroverted, to avoid injury to testes.

b. Aspiration and Injection of Sclerosant

The cyst containing hydrocoele fluid is completely drained a prerequisite later to follow with injection of sclerosing agents. This initiates an inflammatory reaction and leading to fibrosis between the sac and the testes thus obliterating the cavity.[36] Sclerosing agents commonly used are :

1. Phenol[19,36]
2. 2% Ethanolamine oleate[19]
3. Sodium tetradecyl sulphate,[37,38, 39]
4. Polidocanol[40,41,42] and
5. Tetracyclins.

This procedure is done on outpatient basis.

Procedure:

Scrotal skin is prepared as for any surgery for the scrotum. No anesthesia is needed. The Puncture site is planned taking in care the position of testes, puncture is made in the most distended part of the swelling, upper or middle part, lower aspect of swelling is not used as in dependant position the sclerosant may seep into subcutaneous space causing irritation and pain. 18G needle with 20ml syringe is taken and fluid aspirated out.

Note the volume of aspirated fluid, sclerosant is then injected. Once injected the scrotum is massaged to make a distribution throughout the sac. Scrotal support is given. Patient is mobilized after 15-20minutes.

The volume of sclerosant is calculated by the volume of fluid aspirated.[43]

Indications: Sclerotherapy is most useful in older men in whom fertility is no longer an issue (Sigurdsson et.al,1994)[2].

Contraindication

1. Presence of Hernia.
2. History of acute of chronic epididymitis.
3. Patients less than 50 yrs (HU et al).
4. Huge Hydrocoele.

Advantages

Simple, done on outpatient basis, economical and recovery is rapid.

Disadvantages

Pain, Swelling recurrence, Haematoma, injury to testes or epididymis, allergic manifestation to the agent used, not able to do in longstanding case, calcified sac. When hydrocoele recurs after sclerotherapy, it is usually multiloculated and difficult to repair later[2].

The success rate for aspiration and sclerotherapy was 76% compare to hydrocoelectomy 84%. However aspiration sclerotherapy is a viable line of therapy in the management of hydrocoele[44].

Fournier's gangrene- a rare complication of hydrocoele aspiration is demonstrated[45].

Surgical Management of Hydrocoele

Gold standard treatment for all primary hydrocoele.

Principle-

The hydrocoele fluid is secreted by the visceral layer of tunica vaginalis, as explained in early part primary hydrocoele are due to defective absorption of fluid of the parietal layer of tunica leading to accumulation of fluid in the sac. Treatment

involves the opening of the sac and exposing the visceral layer to the surrounding tissues later the secreted fluid is drained to the lymphatics, also the visceral layer gets infiltrated to the surrounding tissues and gets obliterated.

Operative Treatment

Anesthesia for operation on hydrocele

1. Local anaesthesia
2. Spermatic cord block
3. Spinal anesthesia

The posterior 1/3 of the scrotum is innervated by S3 segment; where as anterior 2/3 is

innervated by L_1.

Spinal anesthesia though very good for operations below the level of umbilicus, it is not preferred in operations for hydrocele because immediately after heavy anesthesia, the blood pressure falls. Hence bleeding points are few. Though the Haemostasis is secured with care, after the effect of anesthesia is worn off the blood vessels of testes which arise from aorta directly bleed profusely and cause haematoma and along with other complications. This fact is to be born in mind while positioning the patient for heavy spinal anesthesia. Hence nitrous oxide and oxygen is the anesthesia of choice. Alternatively local infiltration with 2% xylocaine can be used along the line of incision and also the cord must be blocked.

Techniques

Operative techniques can be grouped into 5 groups.

1. Dissection and Excision of the Sac- Radical operation[7]
2. Dissection and Eversion of the Sac- Bottles operation[14]

a. Andrew bottle operation.

b. Jaboulay's procedure[9]

c. Winkelmanns techniquue[7]

3. NO Dissection/ Excision of sac technique
   a. Solomon's extrusion procedure[46]
   b. Wilkinsons technique[17]
   c. Lords plication[7]
   d. Sharma and Jhawer's minimal dissection technique[18]
4. Drainage technique.
   a. Window operation[15.]
   b. Vaginal fenestration[11]
5. Newer techniques.
   a. Silicone catheter draining.

Dissection and Excision of Sac:

Radical technique, the entire hydrocoele sac is dissected free and mobilized completely. Sac is opened and drained, the parietal layer of tunica is excised leaving a fingerbreadth margin to avoid injury to epididymis and edges are over sewn with chromic catgut, Baseball stitch. This technique is done in long standing hydrocoele with thick walled sac and for multiloculated hydrocoele[2].

Dissection and Eversion of Sac

Number of operations involving this technique has a basic step of everything the sac i.e. parietal layer of tunica vaginalis. The secretory part of the sac is now exposed to the subcutaneous lymphatics to absorb the fluid. Later the secretory part gets destroyed by friction and secretion stops from the tunica.

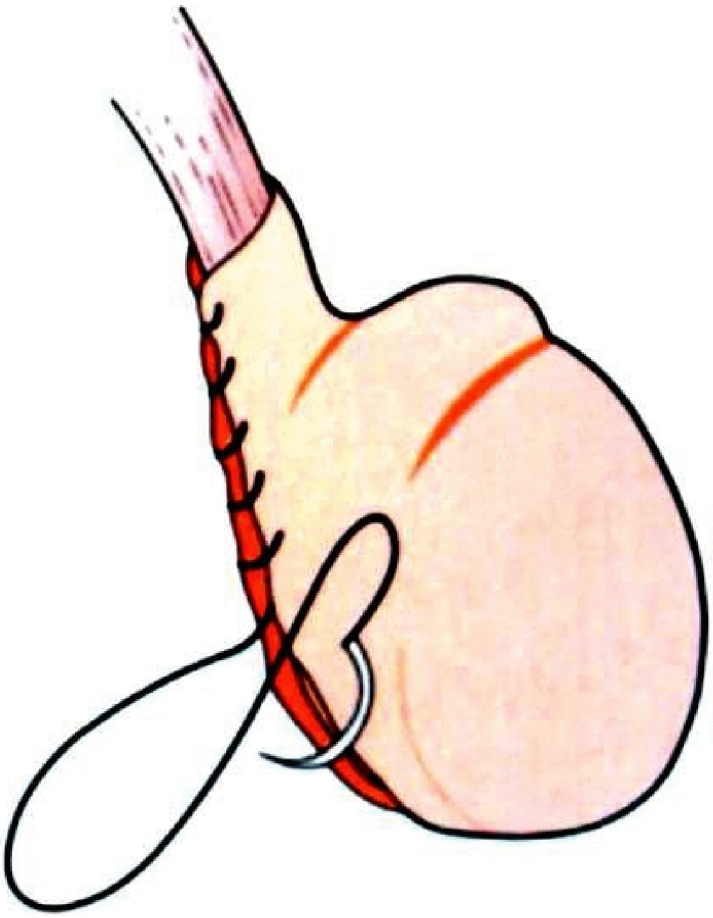
Andrew Bottle Operation- the sac is dissected completely and emptied through a small incision, the testes are pulled out through the incision everting the parietal layer and placing the testes back in scrotum. No suture is used[14].

Jaboulays eversion of the sac- dissecting the hydrocoele sac free and delivering the testes into the wound. Then anterior incision is placed and sac is everted and suture behind the testes in such a way that the whole serous lining faces outward[48]. The sac margin should be left 1cm wider to prevent constriction of cord.

Winkelmanns technique- similar to Jaboulay's procedure except that the sac is excised partially and then suture as in Jaboulay's behind the testes, exposing the secretory surface outside.[7]

Procedure

Parts are painted and draped for inguinal or scrotal approach. Inguinal incision is placed over the superficial inguinal ring obliquely, open the covering to expose the hydrocoele sac which is separated from the scrotum by passing finger and sweeping it around – finger dissection, the testes are delivered out of the wound. If hydrocoele is huge the upper part is delivered and fluid is drained after which the whole of the sac is delivered out.



SAC EVERTED AND SUTURED BEHIND

Scrotal incision is planned in the most distended part of the hydrocoele after the hydrocoele is held in gauze. The coverings are opened layer by layer to identify the sac. Enucleate the sac by finger dissection. Tunica is opened in an avascular area fluid is evacuated; the sac is everted so that it lies entirely behind the testes. Haemostasis is secured, few interrupted stitches are placed behind the testes taking the everted sac, care is to be taken not to be too tight around the cord to prevent the interference of blood supply to testes. Testes are returned back in place once haemostasis is achieved, in doubt a drain is placed – corrugated drain, then the incision is closed.

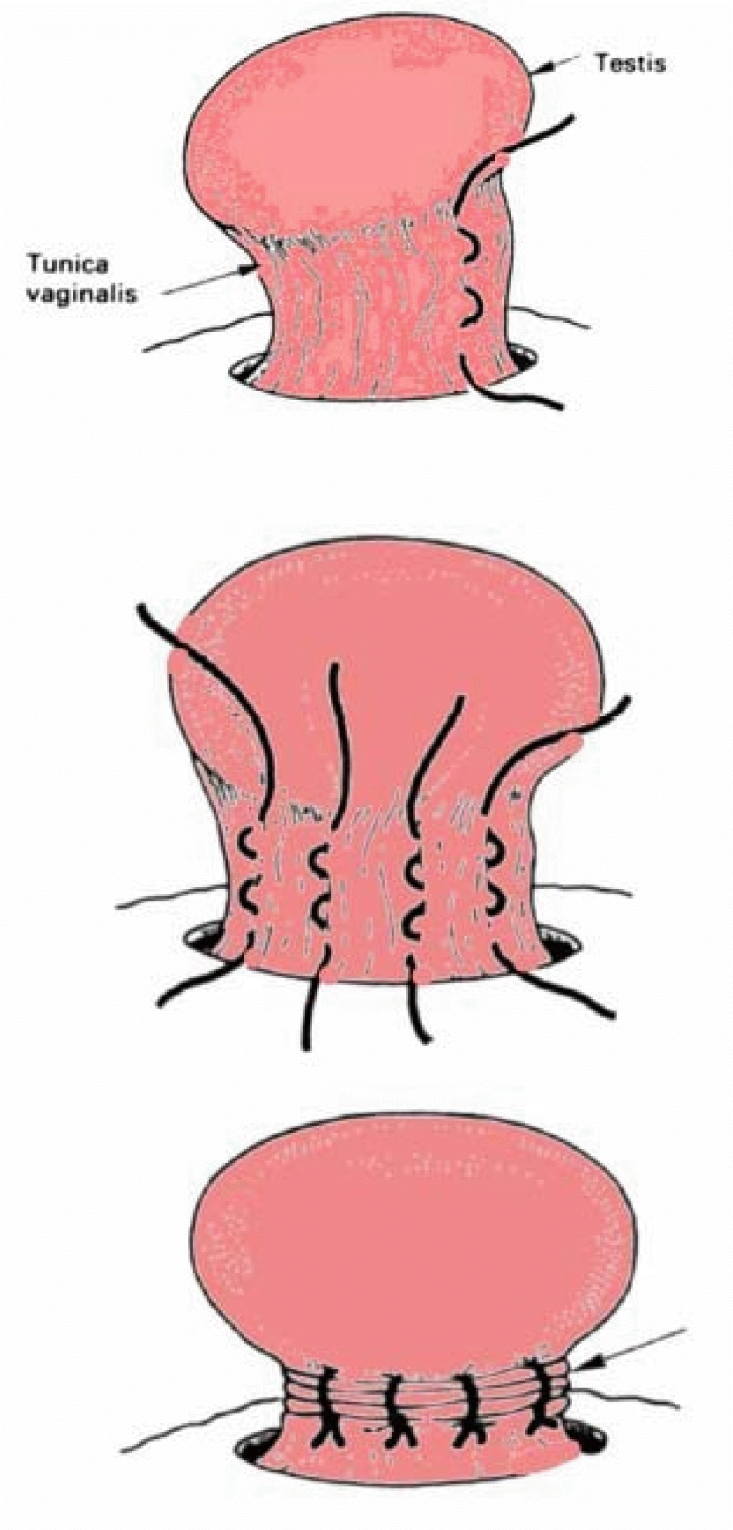
As a precautionary measure the scrotum is supported by compression bandage to prevent haematoma formation. Postoperative analgesia and sedation for a day and drain is removed after 24-48 hrs suture removed on 8th postoperative day.

Bilateral hydrocoele can be approached by a single horizontal incision from one superficial ring to the opposite, to carry the remaining procedure as mentioned or dealt separately. It's the choice of the surgeon.

No Dissection of Excision of Sac Techniques

This type of technique carries minimal dissection or no dissection of the hydrocoele.

- Solomon's extrusion operation- small incision is made in tunica vaginalis to allow the testes to be pulled out of hydrocoele and then suture to sinus of epididymis, thus closing the sac with no excision of the tunica[46].
- Wilkinson's technique- testes are pulled out of the hydrocoele sac and the internal spermatic fascia, sac fluid is drained and emptied but not dissected, however sac everted[17].



LORDS PLICATION

- Lord's plication- hydrocoele sac is opened and testes are brought out with some eversion of the tunica. The tunica is then plicated by taking radial sutures 1 cm apart, forming a collar around the junction of the testes and epididymis. No dissection or excision of the tunica is done. Since sac is not dissected, the technique is bloodless. This type of procedure is employed for thin, small hyrocoele.[8]
- Sharma and Jhawer's minimal dissection technique- the procedure is similar to Lord's procedure, but instead only a small nick in the tunica and the testes are delivered out, and a small pocket is created in the subcutaneous plane by finger dissection and testes are placed in this subcutaneous pouch[18].

Drainage Techniques

Internal drainage procedure involves removing the barrier of the non draining lymphatic layer and exposing the testes to scrotal skin lymphatics, which absorb fluid as formed. A small window is made in the tunica vaginalis so that the fluids are drained to the subcutaneous tissues, which are picked by lymphatics of scrotal wall. The window opening edges are sutured, making the opening a draining channe[14].

Procedure

Parts painted and draped as that of any scrotal surgery, a small transverse skin incision is placed on the point of maximal distension the layers are separated to identify the tunica of hydrocoele. The sac is stabbed to drain the fluid, the edge of the opening is dissected up either side, and then these are tented through the incision in the scrotum. The testes are not delivered out of the wound and only amount of the sac that can be easily tented is removed. A disk of about 2inches diameter is excised from the parietal layer of the sac, the dartos is closed by continuous suture and skin

closed. No drain is kept. This technique is done in patients with thick and tense adherent sac where stripping of the sac is not easy.[4]

Advantage: easy, simple, minimal postoperative complications

Disadvantage: high recurrence rate, when done for large hydrocoele suggesting that it is unsuitable for idiopathic large hydrocoele[2]. Window can get blocked by adhesion of the tunica or by scar formation.

Silicon Catheter Dra\inage:

Silicone catheter of 15 to 20 cm in length, in which hole had been made to enable flow of the hydrocoele fluid from parietal layer of tunica vaginalis to the surrounding scrotal tissue.

Procedure

After an incision of approximately 5mm on the scrotal wall with a scalpel knife, a cannula was pushed through the hydrocoele sac with a gentle rotation until reaching the upper scrotal wall. Silicone catheter with holes was passed through the cannula to the point of incision by way of the cannula. At the end, both the tips of catheter were sutured[47].

I. Infantile Hydrocoele

Inguinal canal is opened through inguinal incision similar for an hernia surgery. The hydrocoele sac extent is identified upto the deep inguinal ring, exclude the hydrocoele-en-bissac, the sac then is separated from the cord structures and sac excised and everted. Wound is closed in layers.

III. Encysted Hydrocoele of the Cord

The inguinal canal is opened by inguinal incision, the cyst is dissected separated out of the cord structures and excised. Wound closed in layers.

IV. Abdominoscrotal Hydrocoele

Complete excision is possible by inguinal incision or midline incision occasionally to identify the abdominal component. Sac is separated from the cord structures and excised.

Excisional techniques are most certain to result in permanent elimination of hydrocoele[2].

V. Epididymal cyst and Spermatocole

Epididymal cysts are multiloculated and thus aspiration has no role in treatment.

Larger ones of spermatocoele should be aspirated[1].

Aspiration and Sclerotherapy not recommended as can cause chemical epididymitis which can lead to sterility[20], also postoperative pain is more and chance of recurrence is high.

Surgery, excision of the cyst through the scrotal incision is indicated when it causes enlargement and pain.

Patients are warned of interference with the transport of sperms from the testes on the operated site. Long-term observation shows epididymal obstruction in most cases and intervention is unnecessary.

VI. Secondary Hydrocoele

Management of secondary hydrocoele consists of treatment of the primary lesion. However treating the primary for testicular malignancy needs orchidectomy and further depending on the stage of the disease. Tuberculous hydrocoele not responding Anti-tuberculous treatment may need orchidectomy. Post varicocoelectomy 50% of these secondary hydrocoele requires surgical excision.

VII. Haematocoele

Surgical exploration and evacuation of the clot is the treatment of choice. In long standing cases the testes may be disorganized and damaged and atrophic due to pressure of the heamatoma, such case may follow orchidectomy under consent.

Clotted haematocoele result from slow spontaneous ooze, it may be difficult to be sure that swelling is not due to testicular tumor. Indeed a tumour may present as a haematocoele. Treatment is by Orchidectomy, unless the testes in indubitably benign. As a rule, it is impossible to be certain of this until the mass has been bisected.[1]

VIII. Sebaceous cysts

- Single cyst- excision of the cyst wall completely.
- Multiple cysts- affecting only a part of the skin, excision of the part of the skin is affected and suturing done.
- Multiple cysts spreading all over the scrotum- whole of the scrotal skin is excised, the testes are placed in a pocket made in the subcutaneous tissue at the medial side of the thigh.

IX. TREATMENT OF FILARIAL HYDROCELE AND CHYLOCELES

Treatment is by rest, aspiration and drugs (Diethyl carbomezine 3.6mg/kg body wt/day for three weeks, abolishes microflaria and may kill adult worm also).

SURGICAL LINE :

Principle : Construction of new lymphatics pathways. This can be achieved by contructing cellular cutaneous bridges. Uniting scrotum to the thigh allowing scrotal lymph absorption through the uninvolved thigh.

In advanced cases, Excision of all involved skin with implantation of testis into the thighs and Primary skin grafting is done concomitant hydrocele is treated by excision of sac.

X. Funicular hydrocele :

Inguinal canal is opened through inguinal incision. The sac is ligated at the deep Inguinal ring and divided. Distal part of the sac is pulled out and excised wound closed in layers.

XI. Endoscopic Hydrocele Ablation :

A new technique for the treatment of hydrocele by percutaneous drainage and endoscopic ablation under direct vision. Open surgical repair has been regarded as the standard treatment for symptomatic scrotal hydrocele. However postoperative discomfort and convalescence associated with this operation have led the surgeons (Urologists) to seek invasive alternatives. Hydrocele aspiration with chemical sclerotherapy, which is associated with complication like, Infection, Haematoma, Scrotal pain, requiring several days of bed rest, more over single treatment success rate is significantly lower.

In an effort and decrease the morbidity of hydrocele ablation they have, attempted a new endoscopic technique for the treatment of symptomatic hydrocele. Continuous flow of irritants is achieved by instilling glycine through the resectoscope and allowing it to drain through the insufflations part of the trocar. With proper video monitoring the parietal surface of the hydrocele is completely ablated using dia thermy cautery applied via roller ball electrode or coagulation setting at 35V. Care is taken not to fulgrate the testis or epididymis. The ablatad hydrocele sac is irrigated with antibiotic solution. The resectoscope is removed and ¼ inch penrose drain is placed. Drain is secured with 3-0 nylon and compression bandage applied.

The procedure takes about 25minutes. No postoperative complications or blood loss

Drain removed on the next day and very minimal discomfort reported. The patient resumed his normal life after 2 days. Follow up for 6 months, and there was no evidence of recurrence.

Procedure :

Pre-operative prophylactic antibiotic is given (1gm cephalosporin) before. Under spinal anesthesia 1cm transverse skin incision is made at the most dependent portion of the left hemiscrotum. Through this incision 10 or 11mm laparoscopic trocar was inserted into the sac. The obturator is removed and 28F resectoscope with 30deg lens is inserted via the trocar. The surface of the testis, epididymis and scrotal wall were inspected. The hydrocoele fluid is also inspected and then the fluid drained through trocar sheath.

8. Postoperative Complications-Prevention and Management

1. Pain: commonest complication post hydrocoelectomy. Management is by scrotal support and analgesics, sometimes sedation. Care is taken during reposition of the testes back into the scrotum in normal position, as torsion of the testes may manifest as a post operative pain, but it is severe agonizing pain, at this stage reexploration is indicated and testes repositioned when viable, otherwise orchidectomy if infarction of testes has occurred.

Pain is also a manifestation of heamatoma and infection of the wound. Chronic pain is seen in patients treated surgically in 0.6%.[49]

2. Scrotal odema: abnormal increase in interstitial fluid following tissue dissection and disruption of scrotal lymphatics causes the edema. Prevention is always better by careful handling of the tissues and proper technique employed. Management is by scrotal support and anti-inflammatory drugs.

3. Haematoma: a common complication occurs due to following factors

- inadequate haemostasis
- ooze from small vessels when anaesthesia wears off and blood pressure falls causes significant collection to form haematoma
- testes are covered by loose scrotal wall. These are avoided by dressing a pressure bandage to the scrotum after the dressing of the wound and giving scrotal support, placing a drain peroperative.

Once haematoma is formed as manifested by pain in the scrotum and swelling which is progressive may need emergency reexploration.

4.Infection: Infection is a major cause of postoperative morbidity. The hallmark of infection is fever. Local signs of wound infection are seen.

- Stitch abscess- 6th or 7th post operative day, there starts a discharge from single or multiple points at the stitched point. Stitches are removed to drain the collection inside and covering antibiotics shall suffice the problem.
- Superficial infection- signs of inflammation, erythema, odema, local rise in temperature is seen. Treatment is by anti-inflammatory and local dressings.
- Deep infections- present with wound gap, to expose the testes. Treatment is by regular dressing of the wound, if require debridement of the unhealthy tissue and antibiotics covering.

5. Recurrence of hydrocoele- is observed in 9.3% considered as treatment failure, treated by surgery

6. Sterility- epididymal cyst excision and spermatocoele excision occasionally follow with these complications.

7. Recurrence - Recurrence of cystic swelling of scrotum can occur in some of the cases. This is treated by surgery

Image 1 : Right Sided Hydrocoele

Image 2 : Bilateral Hydrocoele

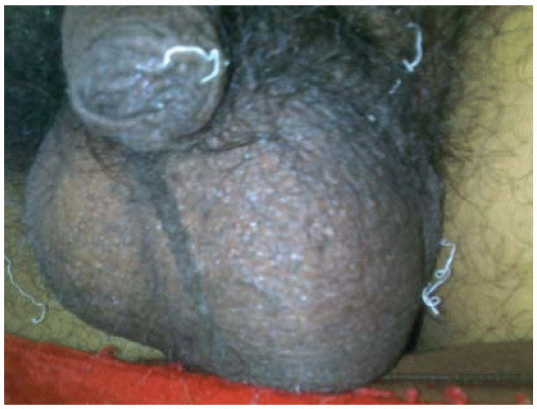


Image 3 : Left Sided Haematocoele

Image 4 : Multiple Sebaceous Cyst

Image 5 : Right Sided Epididymal Cyst

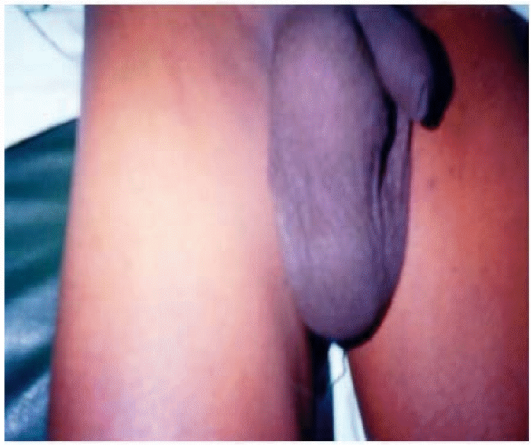


Image 6 : Encysted Hydrocoele Of Cord

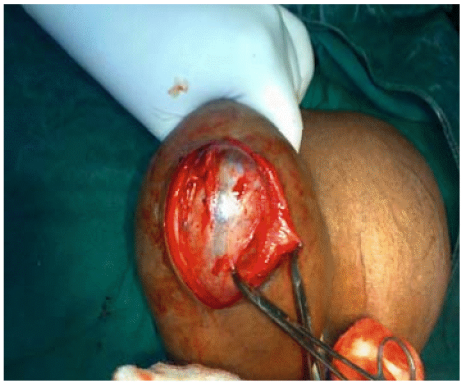


Image 7 ; Scrotum opening in layers

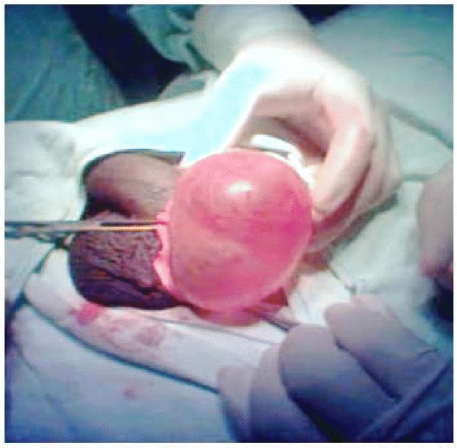


Image 8: Parietal layer of Tunica vaginalis

Image 9: Puncturing and removing hydrocoele fluid

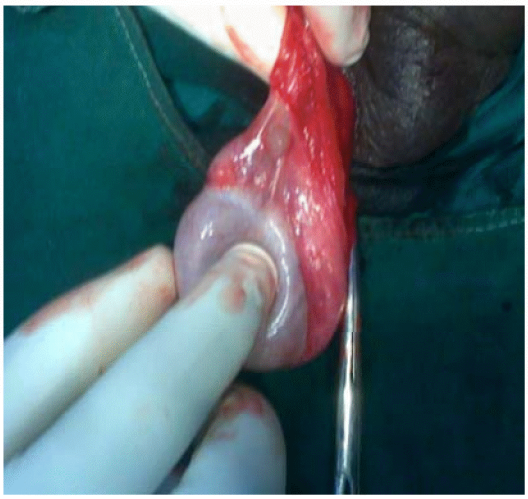


Image 10 : Testis epididymis with epididymal cyst

Image11:Excision of skin and primary suturing in a case of multiple sebaceous cyst

SURGICAL TREATMENT OF CYSTIC SWELLINGS OF THE SCROTUM USING SMALL AND LARGE INCISION

Filly-one patients underwent surgery for symptomatic epididymal cysts or hydroceles, using local anaesthesia with no sedation and no diathermy. Of the patients surveyed, 91% found the procedure comfortable or uncomfortable, 9% finding it painful.

Most patients (8 9%) were fully recovered after 3 weeks. None of the patients had to have operative intervention for complications. Treatment of these conditions under local anaesthesia is cost-effective, and can be performed with the minimum of special equipment on patients who might otherwise be unfit for a general anaesthetic. Treatment of simple hydroceles and epididymal cysts is sometimes required if they produce troublesome symptoms of pain and discomfort. Conventional treatments include repeated aspiration, aspiration and injection of sclerosant (1,2), or surgery. Many of the patients with these lesions are old and have co-existing cardiac or pulmonary disease, making general anaesthesia undesirable. Aspiration and injection of sclerosant can cause severe pain, and simple aspiration has to be repeated ad infinitum and carries risks of infection or haematoma formation. With this in mind, the present study was undertaken to assess the feasibility of performing surgery on cystic lesions of the scrotum (epididymal cysts and hydroceles) using local anaesthesia.

Patients and methods

Patients who presented with painless cystic scrotal swellings were assessed in the outpatient clinic and significant underlying disease was eliminated using transillumination and scrotal ultrasound. In the case of epididyrnal cysts, the testis

could be clearly palpated separate from the transillurninable swelling, but where there was doubt about the exact nature of the swelling, or where there was an obvious hydrocele with an impalpabletestis, ultrasound was used to assess the testis.

TREND TOWARDS SMALL INCISION

Patients with small epididymal cysts or hydroceles were reassured and discharged back to the general practitioner. Patients were only offered an operation if the swelling was causing significant discomfort or pain. All the operations were performed by the author, the majority being performed in the treatment room on the day ward. No diathermy was used, and the patients were discharged home 45 mm after the end of the operation with oral analgesia. No sedation was given, and local anaesthesia was obtained using 0.25% plain bupivacaine. The local anaesthetic was administered in one of two ways. If the lesion was thought to be a hydrocele, an injection of 10 ml of 0.25% bupivacaine was placed in the sperinatic cord at the level of the pubic tubercle, If possible, this injection was administered in the doctor office 5-10 n before starting the operation, as previously described by Wakefield and Elewa (3). Just before making the scrotal incision, a further 10 ml of 0.25% bupivacaine was injected into the subcutaneous tissues of the scrotum. If the lesion was thought to be an epididymal cyst, as evidenced by being able to feel the testis separately from the cyst, a spermatic block was not performed. The skin of the scrotum over the cyst was infiltrated, and a further injection was administered at the point where the cyst was attached to the epididymis. The operative technique is very important, being based on the fact that a large cystic lesion can be removed through a very small skin incision if the cyst is first drained through the incision, as described by Lord (4). In the case of epididymal cysts, the layers of the scrotum were incised right down to

the cyst wall. The cyst wall was then deliberately incised and, as the cyst emptied, the lining was drawn out through the wound. The correct tissue plane had been entered, then an extremely thin-walled sac was stripped out, without any need for haemostasis. Sometimes, the cyst was firmly attached to the epididyrnis, in which case an artery forceps was applied across this attachment. In the case of a hydrocele, the skin incision had to be large enough to enable the testis to be delivered out of the scrotum, and then a Lord's plication procedure was performed, using 2/0 Vicrylg sutures (5). Plain catgut was used to close the scrotal skin and the patient was discharged after observation for 45 mm. In some cases, only one (the largest) of several epididymal cysts was excised. A questionnaire (Fig. 1) was sent to every patient after the operation.

Results

A total of 51 patients had surgery for cystic lesions of the scrotum between April 1992 and December 1995. The average age of the patients was 59.3 years (range 20-80 years). The average length of follow-up was 22 months (range 2-44 months). Out of 51 questionnaires, 46 were returned (90%). Of the 46 who returned questionnaires, 3 1 (67%) stated that the operation was comfortable, 11 (24%) stated that it was uncomfortable, and 4 (found it painful. The average time for the patients' own assessment of full recovery from the operation was 1.9 weeks (range 3 h to 8 weeks). Of these 46, 21 recovered fully in 1 week (45%). In all, 30 (65%) patients stated that they had had no complications, 10 (22%) had painful bruising not requiring treatment, 4 (9%) had a wound infection. Two patients (4%) indicated that they had had a large swelling postoperatively and two of the four patients with a wound infection also indicated that they had had a large swelling. No patient

required reoperation in the immediate postoperative period. None of the operations took longer than 22 m and this included one patient with an epididymal cyst containing 700 ml of fluid. In all, 6 (13%) patients indicated that they had had a recurrence of their original problem. Some of these were patients who had had only one of several cysts excised.

Moreover, wound infection, post operative hematoma and pain are dramatically low with small incisional manipulation involving scrotum.

Discussion

In selected cases, surgery is indicated for the treatment of cystic swellings of the scrotum. These results show that the surgery can be carried out satisfactorily under local anaesthesia with minimum discomfort for the patient, only 9% describing the operation as painful, and 91% describing it as comfortable or uncomfortable. In fact, the number of patients experiencing pain during the operation could probably be reduced even further, with meticulous attention to the local anaesthetic block, especially the spermatic cord block, the technique of which probably has a 'learning curve'. The operations described above should be performed by an experience Ct.4 surgeon, but the fact that the operations are carried out under local anaesthesia greatly improves the quality of the surgery. Diathermy was not used in this series because the correct tissue plane was entered early on in the operation, and no scrotal haematomas had to be drained. Great emphasis is laid on the drainage of the cyst as soon as possible after the skin incision has been made, which enables very large cysts (in this series, one containing 700 ml) to be pulled out through a small skin incision (6). The technique is not appropriate for patients with multiple epididymal cysts ;

each cyst has to be teased out separately, which can be time consuming. In this series, several of the patients who had recurrent or persistent symptoms were those who had one of several cysts removed. There are also considerable cost savings in that the patient is only in the hospital for approximately 1 hr, a fully equipped operating theatre is not necessary, and neither general anaesthesia nor sedation is used. Because of this, older unfit patients with troublesome scrotal swelling can be treated more safely.

We would strongly recommend that scrotal cyst surgery is routinely carried out using a small incision under local anesthesia.

METHODOLOGY

The study was done in ***Department of General Surgery, Govt. Rajaji Hospital, Madurai***, from October 2012 to September 2014 which included **50** admitted cases in different surgical units picked randomly and study was conducted as per the proforma.

INCLUSION CRITERIA

1. Patients aged between 0 to 60 years.
2. Cystic swellings from the testes and its coverings, epididymis, spermatic cord and from scrotal skin with informed consent for the proposed surgery were included.

EXCLUSION CRITERIA

1. Cystic inguinoscrotal swellings- congenital and funicular hydrocoele, encysted hydrocoele of the cord, filarial hydrocoele are excluded in this study.
2. Patients aged above 60 yrs.
3. Secondary hydrocele due to post operative and malignancies were excluded.

Method of collection of data ;

Patients admitted with symptoms of swelling, pain, discomfort in the scrotal region were studied with facilities available in the hospital, through a proforma.

1. Detailed History taking.
2. Clinical Examination.
3. Routine Laboratory investigations.
4. Ultrasound in all cases.
5. Performing the surgery for the cases, noting the findings.

6. Postoperative course and management of postoperative complications.
7. Finally follow up was done.

A total of **50** cases were included in the study of which all cases underwent surgical intervention for the disease.

Surgical procedure tailored to the patient's condition was done, corrugated drain was used in few cases. Postoperative scrotal support was given in most of the cases. On discharge of the patient, patient was told for the requirement of the follow up to the outpatient department.

ANALYSIS OF DATA AND RESULTS

Observations and Discussion of Cases

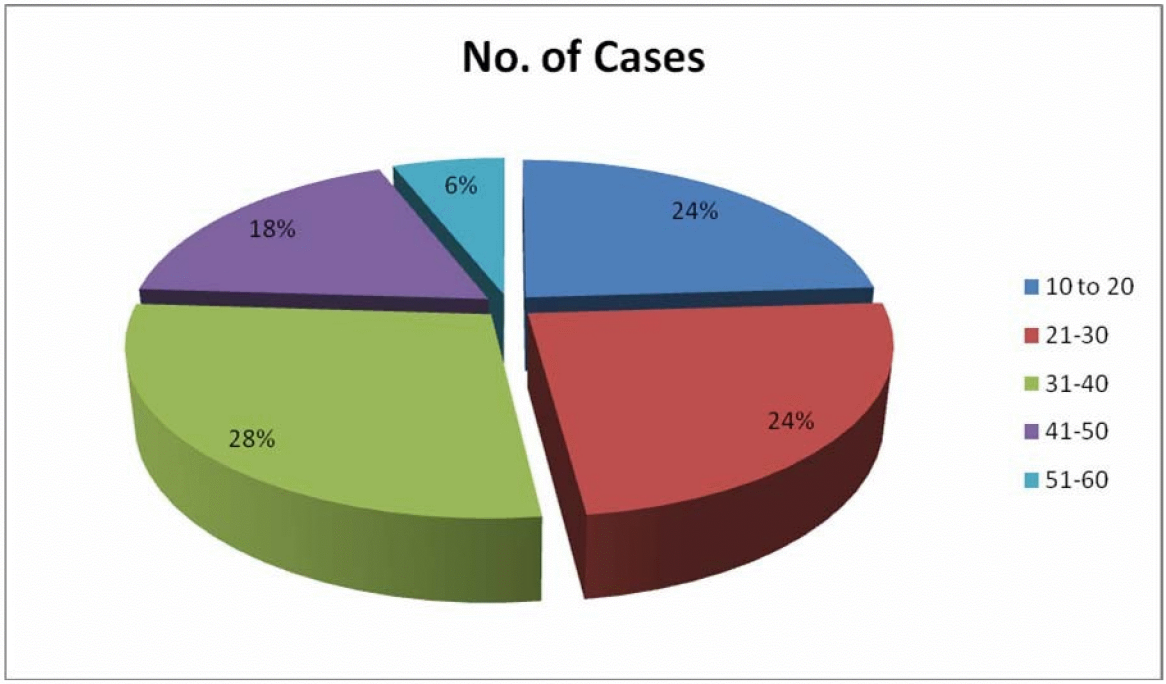
Present study includes **50** cases, admitted to ***Department of General Surgery, Govt. Rajaji Hospital, Madurai.***

ANALYSIS OF DATA

Table 1: Age Incidence of The Cystic Swellings of the Scrotum

Age (years)	No. of Cases	Percentage
10-20	12	24%
21-30	12	24%
31-40	14	28%
41-50	9	18%
51-60	3	6%
Total	**50**	**100%**

Graph 1: Age Incidence of The Cystic Swellings of the Scrotum

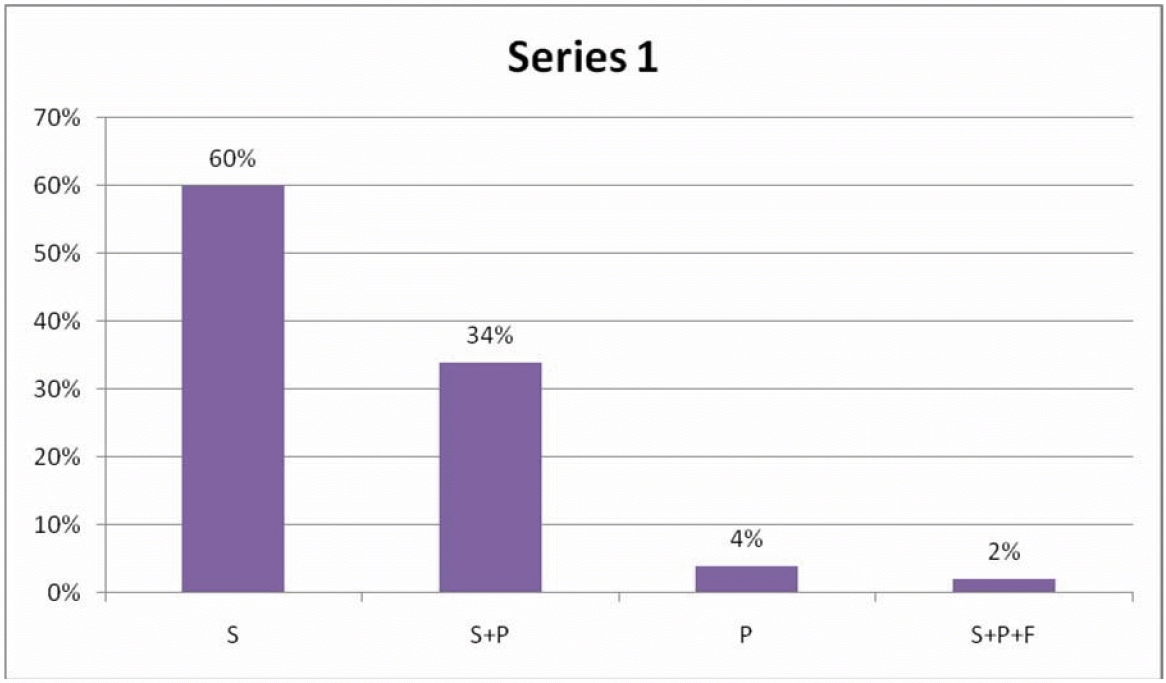


The youngest patient was 11 year old and the oldest was 60 years. Maximum number of cases was seen in the age group between 31-40, 14 cases accounting for 28% of cases; followed by 21-30 age group and 31-40 age group, 14 cases each accounting for 24% of cases. Minimum number of cases are seen in the age group of 51-60, 3 cases accounting 6%.

Table 2: Presenting Features

Presenting Feature	No. of Cases	Percentage
Scrotal Swelling	30	60%
Scrotal Swelling + Pain	17	34%
Pain alone	2	4%
Scrotal Swelling+ Pain+ Fever	1	2%
Total	**50**	**100%**

Graph 2: Presenting Features

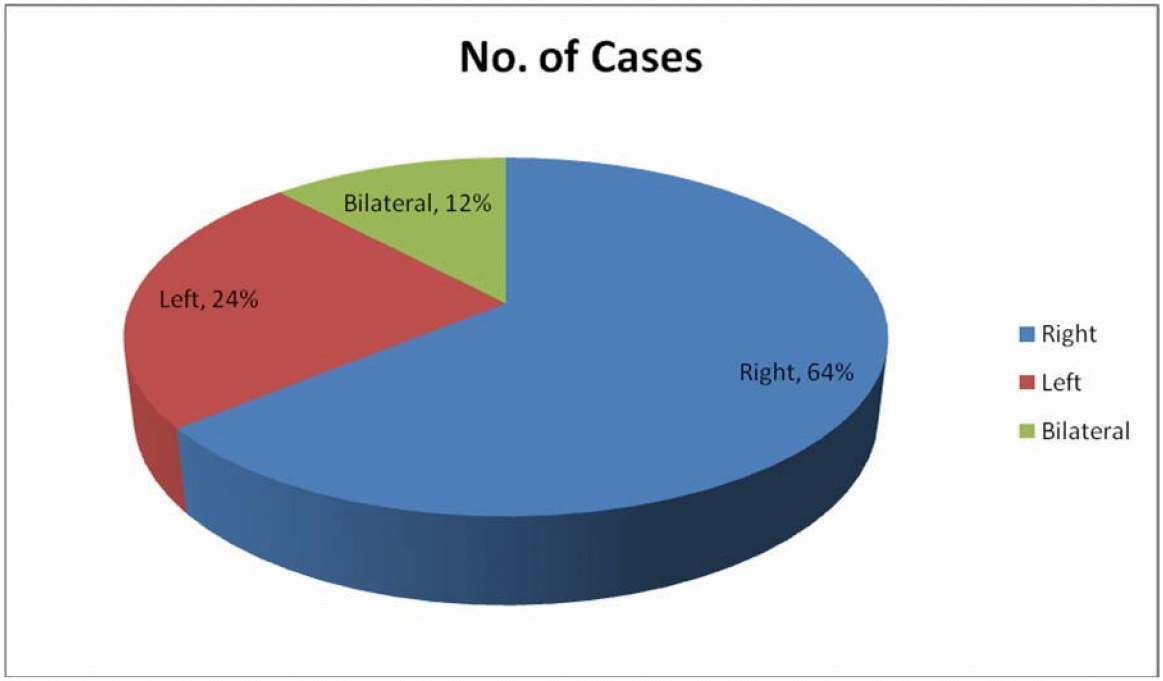


30 patients complained of only scrotal swellings, which accounted 60%. 20 patients complained of pain, which accounted for 40% of cases. Fever was noted in 1 case accounting to 2%.

Table 3: Side of the Swelling

Side	No. of cases	Percentage
Right	32	64%
Left	12	24%
Bilateral	6	12%
Total	50	100%

Graph 3: Side of the Swelling

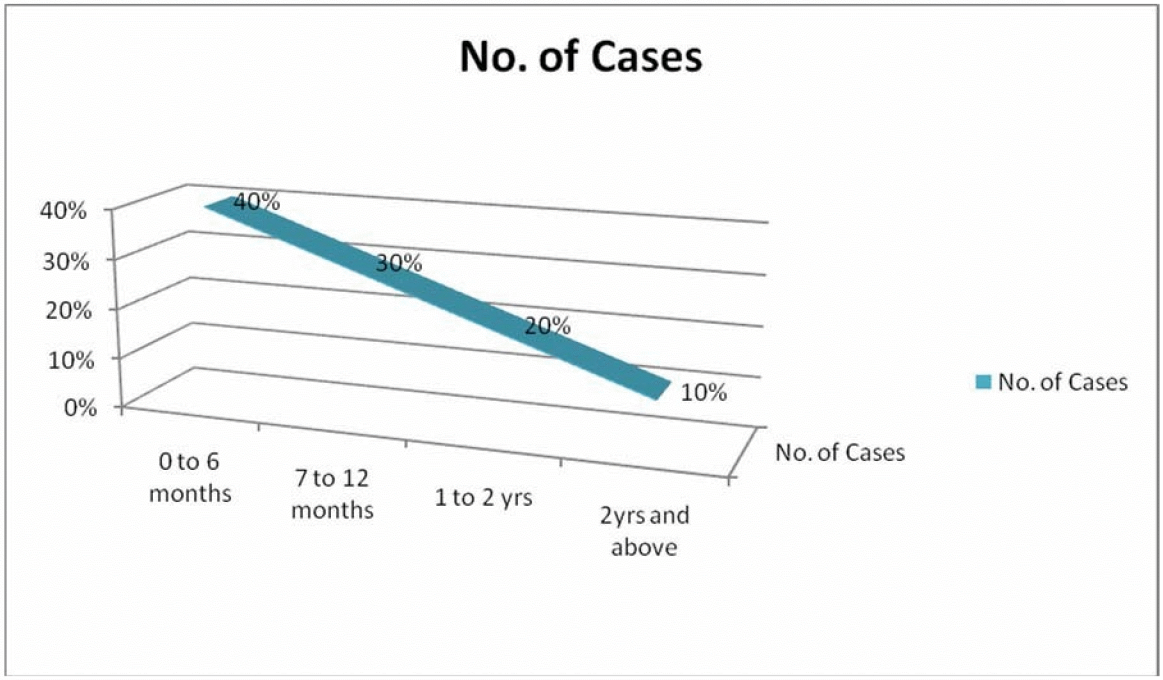


Sidewise distribution of the swellings indicated a higher incidence on the right side of the scrotum, 32 cases accounting for 64% of cases. Whereas left side was 12 cases accounting for 24%, a difference of 40% was noted. Bilateral swellings were present in 6 cases accounting for 12% of which 1 case was multiple sebaceous cysts of scrotum.

Table 4: Showing duration of symptoms

Duration	No. of Cases	Percentage
0 to 6 months	20	40%
7 to 12 months	15	30%
1 to 2 yrs	10	20%
2 yrs and above	5	10%
Total	**50**	**100%**

Graph 4: Showing duration of symptoms

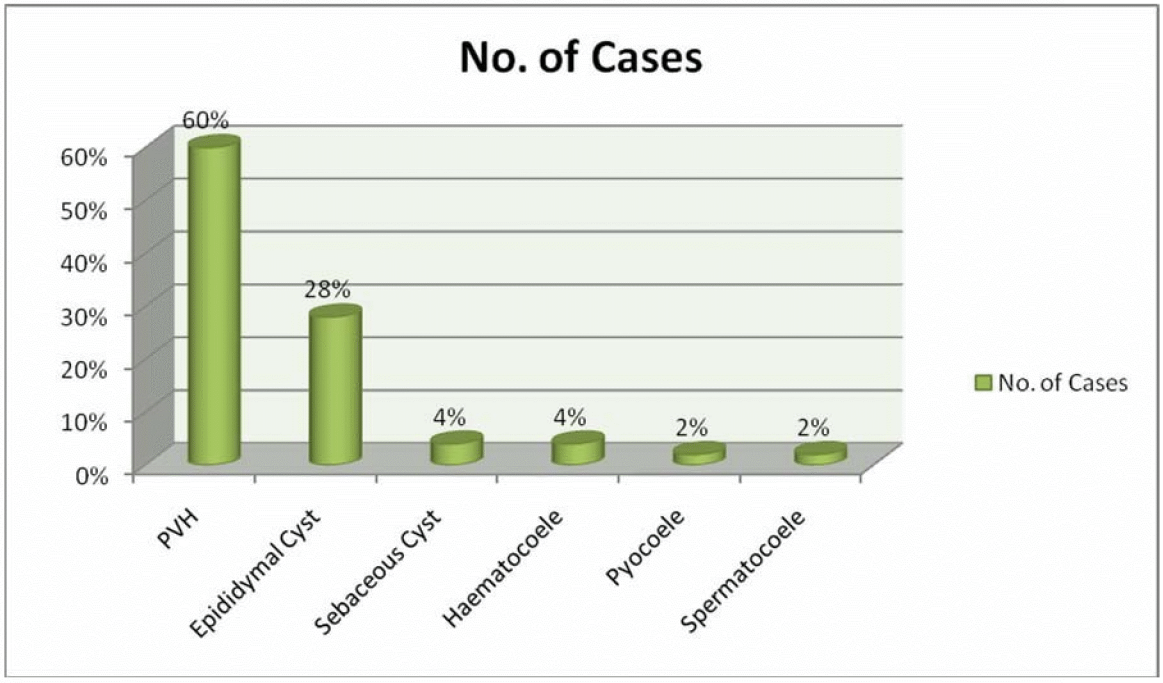


Most of the patients presented with symptoms within 0-6 months were 20 cases accounting for 40% of presentations, followed by is the 7-12 months groups, 15 cases accounting for 30% of cases. Followed by 10 cases presenting with symptoms for 1-2years accounting for 20% .Only 5 patients presented more than 2 years of symptoms.

Table 5: Aetiology of cystic swellings of scrotum

Aetiology	No. of Cases	Percentage
Primary Vaginal Hydrocoele	30	60%
Epididymal Cyst	14	28%
Sebaceous Cyst	2	4%
Haematocoele	2	4%
Pyocoele	1	2%
Spermatocoele	1	2%
Total	**50**	**100%**

Table 5: Aetiology of cystic swellings of scrotum

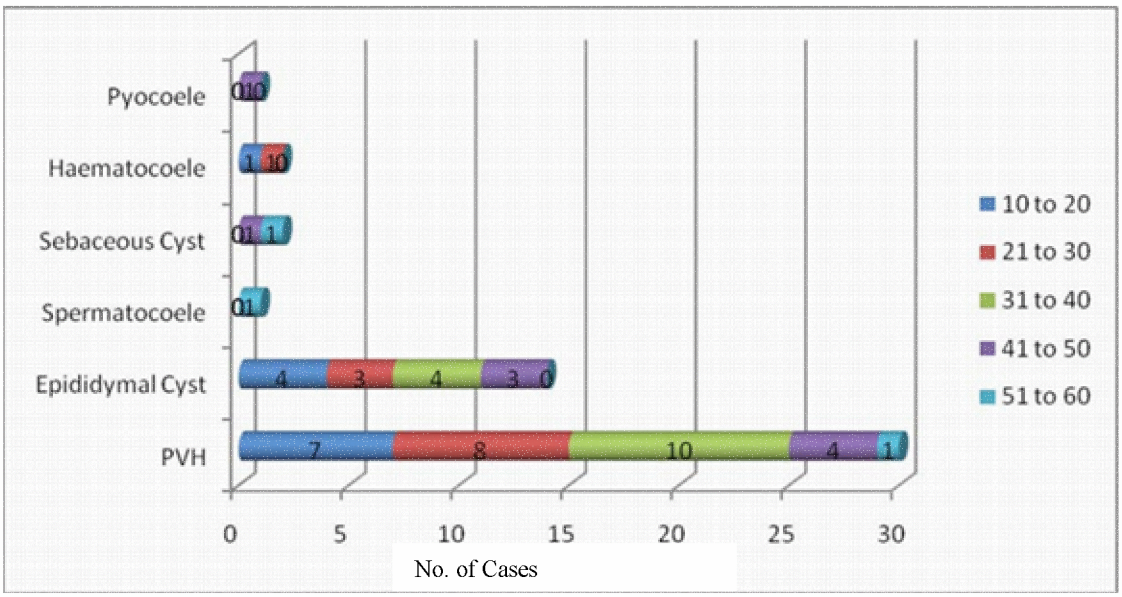


Primary vaginal hydrocoele was the commonest cause of cystic swellings 30 of 50 cases accounting for 60% of the study, followed by Epididymal cyst, 14 cases accounting for 28%. 2 cases of Haematocoele were noted and 2 cases of Sebaceous cyst of which 1 was multiple sebaceous cyst. 1 case each of spermatocoele and pyocoele.

Table 6: Age incidence of aetiological lesions

Aetiology	Age Groups (years)					Total
	10 -20	21- 30	31-40	41-50	51-60	
Primary Vaginal Hydrocoele	7	8	10	4	1	**30**
Epididymal Cyst	4	3	4	3	0	**14**
Spermatocoele	0	0	0	0	1	**1**
Sebaceous Cyst	0	0	0	1	1	**2**
Haematocoele	1	1	0	0	0	**2**
Pyocoele	0	0	0	1	0	**1**
Total	**12**	**12**	**14**	**9**	**3**	**50**

Table 6: Age incidence of etiological lesions

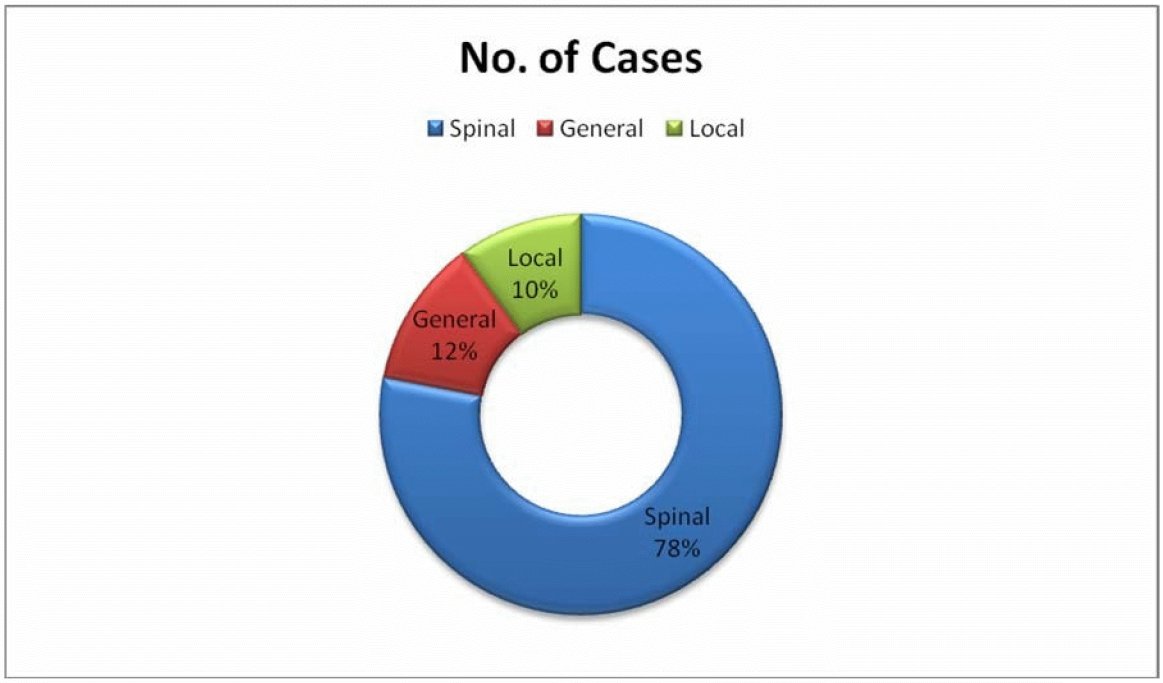


The age distribution of primary vaginal hydrocoele varies from 10- 60 yrs, Maximum number of primary vaginal hydrocoele were seen in 31-40 age group –10 cases; 8 cases in 21-30 age group, followed by 8 cases in 10-20 age group. Epididymal cyst, 4 cases each in 10-20 and 31-40 age group, 3 each in 21-30 and 41-60 age groups. Haematocoele in 10-20 age group and 21-30 age group. One case of Pyocoele was seen in 31-40 age group. One case of Spermatocoele seen in 50-60 age group. 2 cases of Sebaceous cyst seen in 41-50 and 51-60 age group.

Table 7: Types of Anaesthesia employed

Anaesthesia	No. of Cases	Percentage
Spinal	39	78
General	6	12
Local	5	10
Total	**50**	**100**

Graph 7: Types of Anaesthesia employed

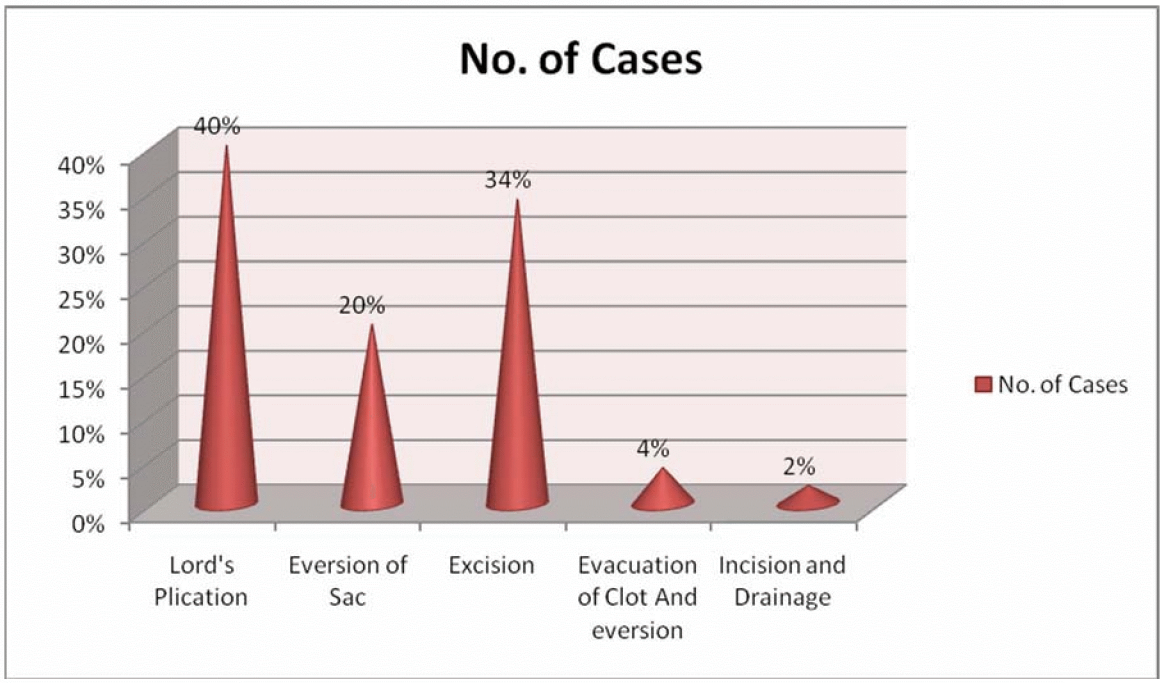


Spinal anaesthesia was used in majority of the cases- 39 of 50 cases accounting for 78 % of cases. General anaesthesia was given in young age group and one case of failed spinal anaesthesia, 6 cases accounting for 12 %. Local anaesthesia was used for excision of single sebaceous cyst and excision of Epididymal cyst.

Table 8: Different surgical procedures employed for treatment of swellings

Procedure	No. of Cases	Percentage
Lord's Plication	20	40%
Eversion of sac	10	20%
Excision	17	34%
Evacuation of clot and eversion	2	4%
Incision and Drainage	1	2%
Total	**50**	**100%**

Graph 8: Different surgical procedures employed for treatment of swellings

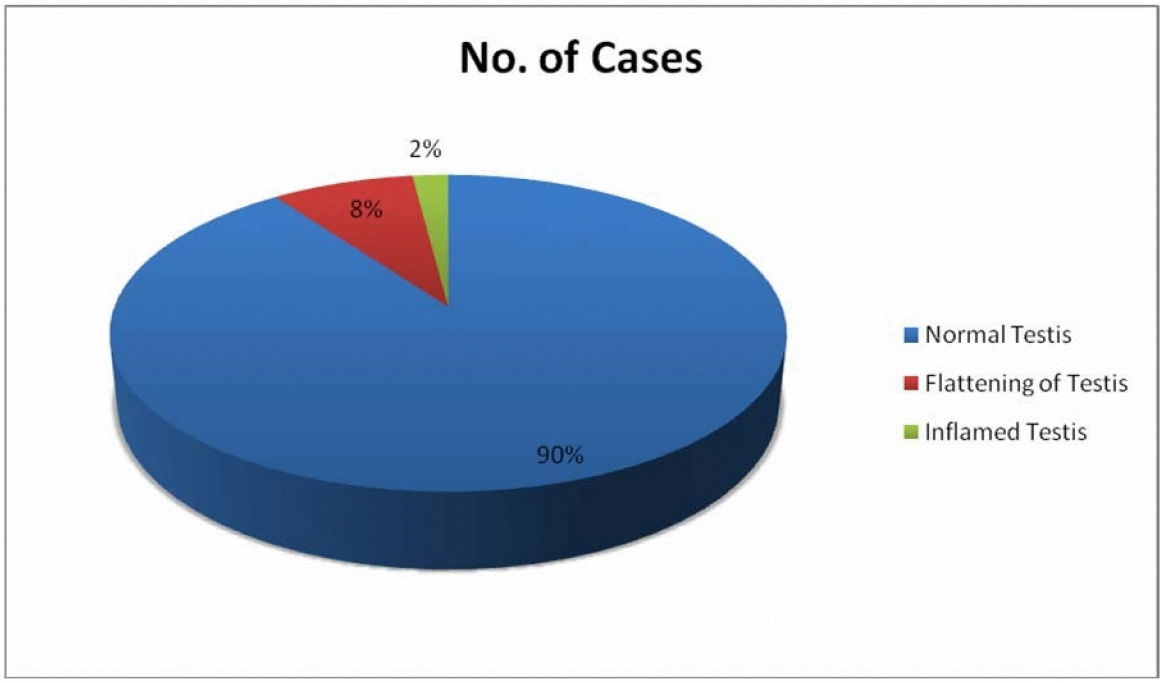


Primary vaginal hydrocoele was treated by Lord's plication in 20 cases, Eversion of sac in 10 cases. Epididymal cyst, spermatocoele, and sebaceous cyst were excised accounting for 17 cases, of which 1 case of multiple sebaceous cyst was treated by excision of skin and primary suturing. Evacuation of clot and eversion were done in 2 cases of haematocoele. Incision and drainage for pyocoele in one case.

Table 9: Per operative findings of Testis

Findings	No. of Cases	Percentage
Normal Testis	45	90%
Flattening of Testis	4	8%
Inflamed Testis	1	2%
Total	50	100%

Graph 9: Per operative findings of Testis

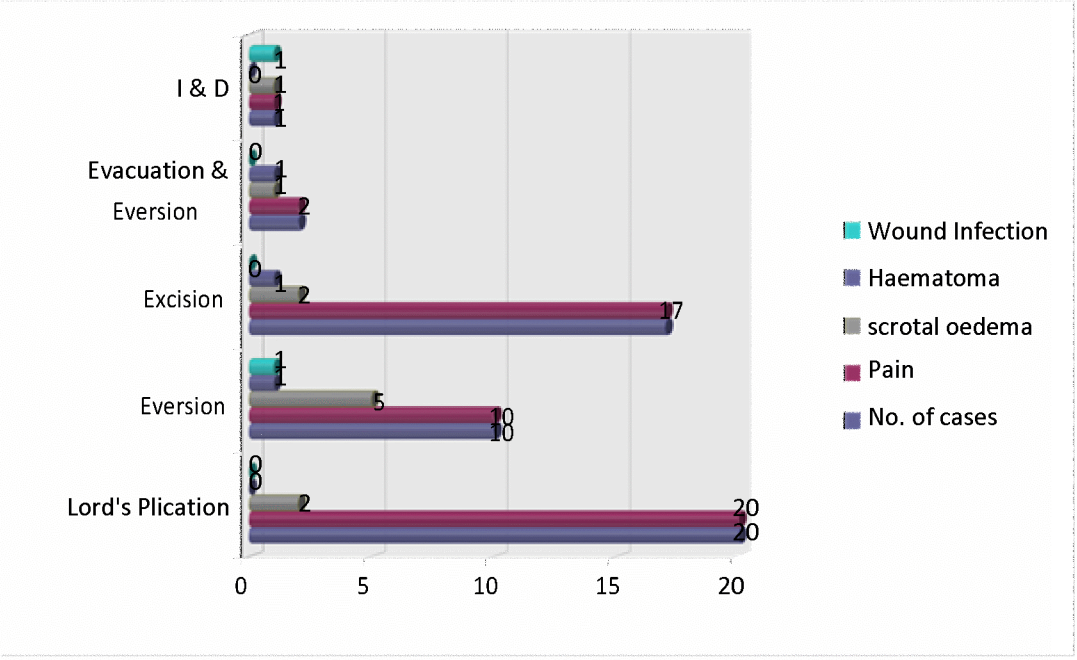


Per-operatively, normal testis was observed in 45 cases(90%); 4 cases showed flattening of testis in Primary vaginal hydrocele(8%). Inflamed testis was seen in 1 case of pyocoele(2%).

Table 10:Post operative complications in the present study with relation to the surgical procedure.

Procedure	No. of Cases	Pain	Scrotal Oedema	Haematoma	Wound Infection
Lord's Plication	20	20	2	0	0
Eversion of sac	10	10	5	1	1
Excision	17	17	2	1	0
Evacuation of clot and eversion of sac	2	2	1	1	0
Incision and Drainage	1	1	1	0	1
Total	**50**	**50**	**11**	**3**	**2**

Graph 10: Post operative complications in the present study with relation to the surgical procedure.

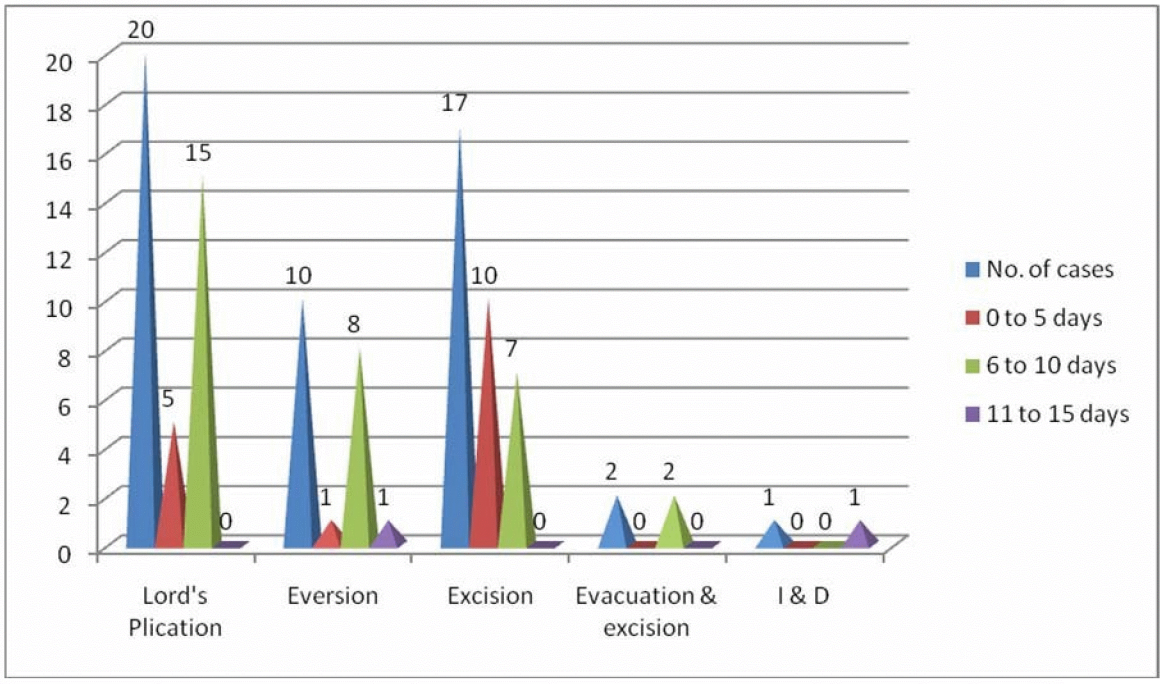


Pain was present postoperatively in all cases. Scrotal edema was seen in 11 cases (22%), Scrotal edema was least in Lord's Plication, when compared to other procedure for vaginal hydrocoele. Haematoma was seen in 3 cases (6%), one case post eversion of sac, One in post epididymal cyst excision, and the other in Evacuation of clot and Eversion of sac.

Table 11: Post operative stay duration

Procedure	No. of cases	No. of days		
		0 to 5	6 to 10	11 to 15
Lord's Plication	20	5	15	0
Eversion of sac	10	1	8	1
Excision	17	10	7	0
Evacuation of clot and eversion of sac	2	0	2	0
Incision and drainage	1	0	0	1
Total	**50**	**16**	**32**	**2**

Table 11: Post operative stay duration



16 patients were discharged between 0-5 days, earliest was among excision for sebaceous cyst, 32 patients were discharged between 6-10 days and 2 patients were discharged between 11-15, late discharge was for the 1 each patient of Eversion of sac and Incision and Drainage due to wound infection. Patients who underwent Lord's procedure had a record of early discharge than compared to eversion of sac for primary vaginal hydrocoele.

Table 12 : PRESENTATION

Presentation	No.of cases
Swelling	33
Swelling & Pain	5
Pain	2
Total	40

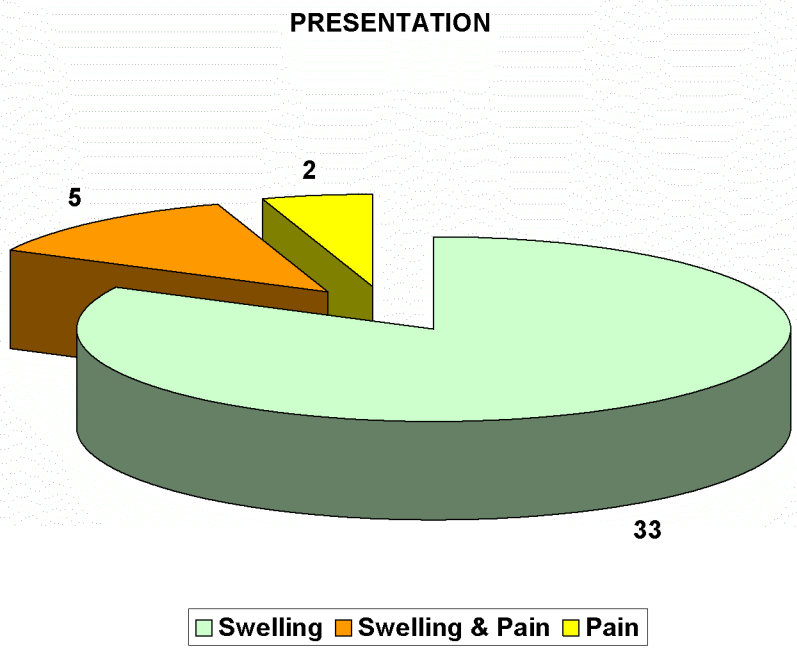


Table 13 : DIAGNOSIS

Diagnosis	No.of cases
Epididymal cyst	11
Small hydrocele	5
Varicocele	5
Sebaceous cyst	5
Large hydrocele	9
Spermatocele	5
Total	40

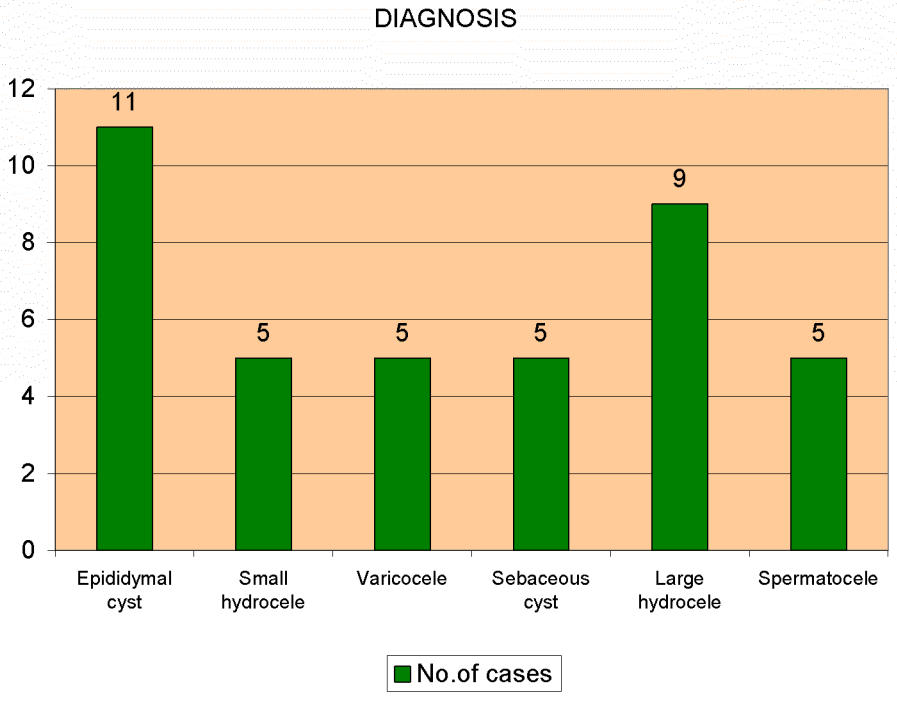


Table 14 : TREATMENT

Treatment	No.of cases
Excision	20
Excision & eversion	14
Ligation	5
Small	1

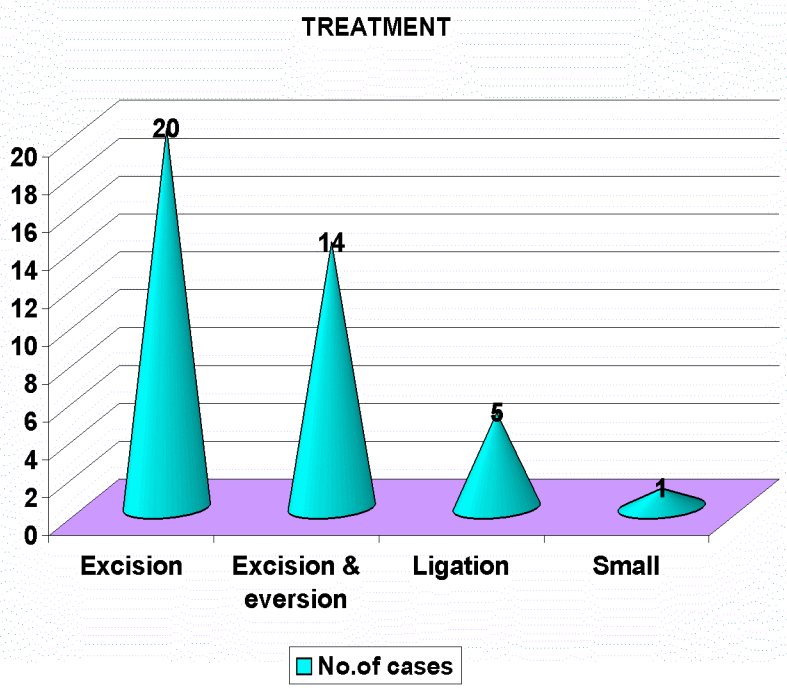


Table 15 : INCISION

Incision	No.of cases
Small	31
Large	9

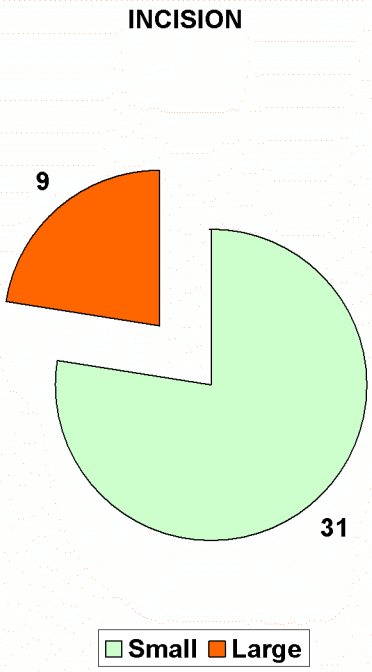


Table 16 : COMPLICATION VS INCISION

Complication	Large Incisional manipulation	Small incisional manipulation
Wound infection	6	8
Post operative Hematoma	3	2
Wound infection along with post op Heamatoma	8	2

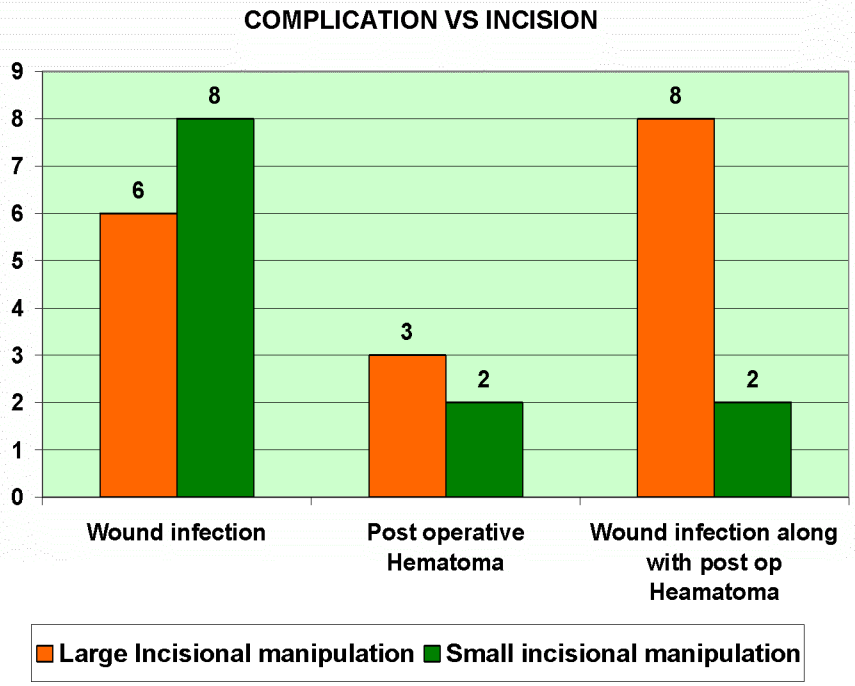


Table – 17

Analysis of Scrotal swelling

Total No.of cases	Small Incision	Large Incision	Period of stay for after surgery for		Complication of large incisional manipulation		Complication of small incisional manipulation
40	31	9	Small incision	Large incision	Type	No.of cases	No.of cases
			2 to 4 days	6 to 8 days	Wound Infection	6	8
					Post operative Hematoma	3	2
					Wound Infection along with post operative hematomo	8	2

From the above study, wound infection, post operative hematoma are less with small incisional manipulation of scrotum.

DISCUSSION

Cystic swellings of the scrotum are a common surgical problem. Present study includes 50 cases with cystic swellings of scrotum, admitted to Department of Surgery, Govt. Rajaji Hospital, Madurai.

Most of the patients were in age group of 31-40 years (28%), presenting feature being scrotal swelling as a main complaint in 60% of cases, majority of them presented with right sided swelling accounting 64% , majority of the swelling showed duration of symptoms with in 6 months, accounting for 40% of the cases. However many other had scrotal swelling with pain or pain alone as a complaint, few presented with fever.

Primary vaginal hydrocele was the commonest cystic swelling (60%), followed by epididymal cyst.

Primary hydrocele is idiopathic in origin, Haematocele followed recent trauma and pyocele was secondary to infection of hydrocele.

On examination, skin rugosity loss was seen on the affected side in majority of patients with swelling, cystic and fluctuant. Transillumination was positive in most of the cases, however longstanding hydrocoele had few transillumination negative. Spermatocoele, haematocoele and pyocoele were transillumination negative. Hydrocoele was more common on the right side than left side, this observation is with respect to study done by C.Mahalingam (1985)[49] and Boukinda F (2003)[50].

After scrotal examination, the diagnosis was confirmed by scrotal ultrasonography in relevant cases.

Routine investigations were done for all cases. Surgical treatment was carried out in all 50 cases. Spinal anaesthesia was used in most of the cases, however General anaesthesia was used in younger age group and one failed case of spinal anaesthesia. Excisions of sebaceous cyst and epididymal cyst in few cases was done under local anaesthesia using 2% xylocaine and Midazolam.

Lord's plication was the procedure found most effective, simple and carried least complication rate than any other procedure for hydrocoele.

The results of present study compared to that of previous series

Author	Year	Journal	Lords Plication		Excision/Eversion of sac	
			No. of Cases	Haematoma	No. of Cases	Haematoma
Effron et al[52]	1967	SGO	29	01	30	09
Dahl et al[53]	1972	Arch Surg	25	01	23	06
Reddy et al[54]	1972	IJS	400	Negligible	-	-
Rai et al[55]	1978	IJS	50	-	20	15
Present study	2009 to 11	-	20	-	10	01

Comparision of the Present Study with Aggarwal Series

Series	Lords Plication			Excision/Eversion of sac		
	No. of Cases	Haematoma	Wound Infection	No. of Cases	Haematoma	Wound Infection
Aggarwal Series[60]	50	-	-	50	14	8
Present Study	20	-	-	10	1	1

O.P.Agarwal in 1983 did a comparative study on radical cure of hydrocele. In this study he showed that among 50 cases who were operated by lords placation, none of them developed haematoma or infection, where as in 50 cases who underwent, eversion of sac 14(28%) cases developed haematoma and 8 (16%) cases developed infection. In our study, among 10 cases underwent eversion of sac only 1 case developed haematoma and 1 case developed wound infection, where as in Lords Plication none of them had haematoma and wound infection except 2 cases, which had scrotal edema.

This study shows that Lords Plication for hydrocele is simple, effective, safe and economical. It is the procedure of choice for management of small to moderte sized primary hydrocele. The only factor against to this procedure is a large hydrocele or a thick walled hydrocoele, where eversion of sac is the operation of choice.

The post operative complication apart from pain, which was common in all patients was a sequelae, scrotal odema was found in 11 patients and haematoma post operatively in 3 cases, This was the result of sac separation and dissection. This was least in Lord's plication, because procedure avoids the opening of the cleavage between the sac and surrounding tissue, thus reducing the oozing and subsequent haematoma formation and thus less post op complication and early discharge from the hospital. However this procedure is barred in long standing large hydrocoele with thick sac, where in eversion of sac was chosen.

Epididymal cyst was the second most common cystic swelling treated by excision few were done under local and were discharged with in 5 days. Similarly spermatocoele was seen in one patient was treated by excision. Haematoma was

treated by evacuation and eversion of the sac. Pyocoele was treated by Incision and Drainage and under suitable antibiotics.

Drain was kept as per the decision by the surgeon in few cases and was removed within 24-48 hrs. All the cases were given tight scrotal support and appropriate antibiotics and analgesics, it helps to relieve pain, reduces edema and haematoma. Post operative complications were managed conservatively with antibiotics, analgesics and scrotal support.

Hydrocoele fluid was amber coloured in primary vaginal hydrocoele, clear in epididymal cyst, haemorrhagic fluid was seen in two cases- haematocoele.

Most of the patient was discharged between 6-10 days. but some patients who developed scrotal edema and infection were kept till 11-15 days.

Patients were then followed up for 2-4 months, there was no recurrence of lesion in the patients followed up during this period.

LIMITATIONS OF THE STUDY

1. This study does not include inguinoscrotal swellings like, Congenital hydrocoele, Funicular hydrocoele, Filarial hydrocoele, Infantile hydrocoele and Encysted hydrocele of the cord.
2. Most of the patients are from rural setup, illiteracy and ignorance was the problem in follow-up of the patients.

CONCLUSIONS

- Majority of the patients with cystic swelling of the scrotum belonged to the 31-40 years of age group 28% followed by 11-20 years and 21-30years of age group 24% each.
- Scrotal swelling was the common mode of presentation (60%).
- Right side was dominant side of presentation than the left with a difference of 40%.
- Most of the patients were suffering with symptoms of duration 0-6 months (40%).
- Primary vaginal hydrocoele was the commonest cause of cystic swelling of scrotum (60%).
- Primary Vaginal hydrocele of long duration can produce pressure effects on the testis.
- Lord's procedure carried least complication and less postoperative stay than any other procedure in treatment of primary vaginal hydrocoele.
- Minimal dissection of the tissues during surgery and good haemostasis are the key to prevent post-operative complications.
- Postoperative stay duration, average was 8 days.
- There was no recurrence of lesion in the patients followed up during 2-4 months.
- From the above study, wound infection, postoperative hematoma are less with small incisional manipulation of scrotum

SUMMARY

Cystic swellings of the scrotum are a common surgical problem. Patient with cystic swellings of scrotum were admitted under the ***Department of General surgery, Govt. Rajaji Hospital, Madurai***, with an aim of studying with respect to age distribution, presentation, management and postoperative complications.

Swelling was the main concern in most of the cases of cystic swellings of Scrotum.

Primary vaginal hydrocoele was the commonest, followed by epididymal cyst, sebaceous cyst, haematocoele spermatocoele and pyocoele accordingly.

Primary hydrocoele is idiopathic in origin, Haematocoele was mainly due to trauma, Pyocoele was due to infection of the hydrocoele.

After scrotal examination, the diagnosis was confirmed by scrotal ultrasonography in relevant cases.

Routine investigations were done for all cases.

Surgical treatment was carried out in all 50 case, Spinal anaesthesia was commonly used, General anaesthesia was given in younger patients and failed spinal anaesthesia,

Local anaesthesia was used for simple excisions.

Primary vaginal hydrocoele was managed by two techniques, Lord's plication, and Jaboulay's Eversion of sac. Lord's was the procedure which had least

complication and lesser post operative stay duration than any other procedure. Excision was done for epididymal cyst, spermatocoele, and sebaceous cyst.

Multiple sebaceous cysts were treated by excision of the scrotal skin which was involved and primary suturing. Haematocoele was treated by evacuation and eversion of sac. Pycoele was incised and drained with supportive antibiotics and analgesics.

All the cases were given tight scrotal support and appropriate antibiotics and analgesics, corrugated rubber drain was placed in some cases and removed after 48 hours.

Postoperatively, pain was present in all cases, with scrotal edema in few cases, infection and haematoma which was treated conservatively

Patients were discharged on average of 8 days.

Patients were then followed for 2-4 months, maximum of 6 months. No recurrences was found in follow-up period.

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PROFORMA

A) Particulars of the patients

Name	IP No.
Age	Date of Admission
Sex	Date of Surgery
Religion	Date of Discharge
Occupation	
Address	

B) Presenting complaints

1. Swelling	
• Duration	
• Unilateral	Rt / Lt
• Bilateral	
2. Mode of onset	Trauma/Spontaneous
3. Progress	Increase in size / remaining same / regression
4. Fever	Yes / No
5. Pain	Yes / No
6. Heaviness	Yes / No
7. Any difficulty in	Micturation / walking /sexual act.
8. Any other symptoms	

C) Past history

1. Any Previous Operative Procedure If, Yes, type of operative procedure

2. History suggestive of TB/Filariasis/UTI/STD Yes / No

D) Family history

1. Married / Unmarried

2. No. of children

3 .Any similar complaints in the family

E) Personal history

1. Appetite

2. Diet

3. Sleep

4. Bowel habit

5. Bladder habit

6. Habits - Smoking/Alcohol/Tobacco chewing

F) Allergic history

G) General Physical examination

1.	Appearance	
2.	Built	Well/Moderate/Poor
3.	Nourishment	Well/Moderate/Poor
4.	Signs of Anaemia	Present/Absent
5.	Icterus	Present/Absent
6.	Clubbing	Present/Absent
7.	Edema	Present/Absent
8.	Generalised Lymphadenopathy	Present/Absent
9.	Koilonychia/platynychia	Present/Absent
10.	Vital parameters	

- Temperature
- Pulse
- Blood pressure
- Respiratory rate

H) Local examination

1. Inspection

i. Swelling

a. Number of swelling

b. Unilateral (Right / Left side or the scrotum) / Bilateral

c. Size

d. Shape

e. Surface

f. Extent

ii. Skin over the swelling

1. Rugosity of scrotal skin	Present / Absent
2. Thickening	Present / Absent
3. Odema	Present / Absent
4. Redness	Present / Absent
5. Median raphe	Shifted/Not shifted
6. Ulcer/ Sinus	Present / Absent

iii. Position of penis Shifted/Not shifted

2. Palpation

i. Swelling

a. Local temperature	Normal / Elevated
b. Tenderness	Present / Absent
c. Size	
d. Shape	
e. Surface	
f. Extent	
g. Margins	Rounded/Irregular/Ill defined
h. Consistency	Soft cystic / Firm / Hard
i. Fluctuation	Present / Absent
j. Translucency	Present / Absent

k. Reducibility Present / Absent

I. Impulse on coughing Present / Absent

m.Getting above the swelling

n. Scrotal skin thickness

ii.Testis

a. Felt / Not felt / Felt separately from the swelling

b. Normal / Abnormal

c. Testicular sensation Present / Absent

iii.Epididymis

a. Normal / Enlarged If enlarged – Head / Body / Tail

b. Size

c. Shape

d. Consistency Soft / Cystic / Firm / Hard / Craggy

e. Fluctuation Present / Absent

f. Translucency Present / Absent

iv. Spermatic Cord

a. Tenderness Present / Absent

b. Thickening Present / Absent

c. Consistency Normal / Otherwise

d. Traction test in case of cord swelling

v. Vas deferens *Normal / Thickened / Beaded*

3 Examination of External Genitalia

4 Regional lymph node examination

5 Per rectal examination

6 Per Abdomen examination

- Ascites Present/Absent

I) Systemic examination

1. Examination of abdomen
2. Respiratory system
3. Cardiovascular system
4. Central nervous system

J) Provisional diagnosis

K) Management

i. Investigations

1. Blood - Hb%, BT, CT, TC, DC, ESR
2. Urine-Albumin, Sugar, Microscopy
3. Radiological study - Chest X-ray / Screening, Ultrasound scrotum, Ultrasound abdomen
4. Any other investigations

ii. Anaesthesia

1. Local
2. Spinal .
3. General

iii. Operative Procedure done and findings

1. Thickness of the sac
2. Hydrocele fluid Quantity, colour
3. Epididymis
4. Fluid from epididymal cyst Quantity, colour

5. Testis

6. Spermatic cord

iv. Drain Used / Not used

v. Post operative course and management

1. Supportive treatment

- Antibiotics
- Analgesics
- Sedation
- Scrotal support

2. Time of drain removal

3. Time of suture removal

4. Complications

- Pain
- Fever
- Skin oedema
- Haematoma
- Infection
- Disruption of wound
- Time of complete healing
- Secondary suturing if any

vi. Fluid analysis

vii. Histopathology report if any

viii. Date of discharge

ix. Follow up

MASTER CHART

Sl. no	IP No	Name	Age (yr)	Presenting Complaints	Duration	Side	Skin Rugosity	Temperature	Tenderness	Consistency	Fluctuation	Transillumination	Get above the Swelling	Testis felt seperately	Spermatic cord	Diagnosis	Anaesthesia	Procedure	Intra operative findings				Drain	POC	POS	FU
																			Testis	Epididymis	Fluid	Sac				
1	59189	Manjunath	20	SS	10m	B/L	P	N	A	Cy	P	P	P	YES	N	EC	SA	EX	N	N	CC	N	NK	PA+HE	8	6m
2	74356	Devaraju	30	SS	2y5m	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	EV	FL	N	AC	N	K	PA	8	2m
3	75797	Mudalagiriah	42	SS	2m	L	P	N	A	Cy	P	P	P	YES	N	EC	SA	EX	N	N	CC	N	NK	PA	5	2m
4	76351	Lakshman Gowda	19	SS	6m	R	P	N	A	Cy	P	P	P	YES	N	EC	SA	EX	N	N	CC	N	NK	PA	5	4m
5	76291	Yogesh	19	SS	1m	R	P	N	A	Cy	P	P	P	YES	N	EC	SA	EX	N	N	CC	N	NK	PA+SO	7	4m
6	84374	Dhode Gowda	60	SS	1y	L	A	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	8	2m
7	87851	Umesh	30	SS+PA	10m	L	A	N	P	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	5	4m
8	12493	Ravishnkar	26	SS+PA	8m	B/L	A	N	P	Cy	P	P	P	NO	N	PVH	SA	EV	N	N	AC	N	K	PA+SO	8	4m
9	208434	Ameerjaha	40	SS	12m	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	8	4m
10	41641	Nikhil	17	SS+PA	6m	L	P	N	P	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	8	6m
11	42071	Ningaiah	40	SS	1y5m	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	EV	N	N	AC	TH	K	PA+IN	12	6m
12	49909	Chiranjeevi	11	SS+PA	6m	L	P	N	P	Cy	P	P	P	NO	N	PVH	GA	LO	N	N	AC	N	K	PA	8	2m
13	50079	Thimmaiah	40	SS	10m	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	8	4m
14	51312	Shivaraju	22	SS	1m	R	P	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	5	2m
15	54199	Chandrashekar	30	SS+PA	2m	R	P	N	P	Cy	P	P	P	YES	N	EC	LA	EX	N	N	CC	N	NK	PA	7	2m
16	55682	Singappa	40	SS	1y	B/L	A	N	A	Cy	P	P	P	NO	N	PVH	SA	EV	N	N	AC	N	K	PA+HE	8	2m
17	59438	Aziz	13	SS	8m	R	P	N	A	Cy	P	P	P	NO	N	PVH	GA	LO	N	N	AC	N	K	PA	8	6m
18	61910	Raju	35	SS+PA	3m	R	P	N	P	Cy	P	P	P	YES	N	EC	SA	EX	N	N	CC	N	NK	PA+SO	7	4m
19	65342	Mahadevaiah	17	SS	1y6m	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	FL	N	AC	N	K	PA	8	4m
20	66310	Rangappa	40	SS	2y	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	TH	K	PA	5	4m
21	69983	Manjunath	26	SS	3m	L	P	N	A	Cy	P	P	P	NO	N	PVH	SA	EV	N	N	AC	N	K	PA	5	6m
22	73089	Shivamallappa	46	SS	2m	R	P	N	A	Cy	P	P	P	YES	N	EC	LA	EX	N	N	CC	N	NK	PA	5	2m
23	89850	Lokesh	29	SS+PA	1y	R	A	N	P	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	8	4m
24	89405	Rathan	36	SS+PA	1m	L	P	N	P	Cy	P	P	P	YES	N	EC	SA	EX	N	N	CC	N	NK	PA	5	4m
25	10584	Jagadeesh	29	SS	6m	R	P	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	N	PA	8	6m

Sl. No	IP No	Name	Age (yr)	Presenting Complaints	Duration	Side	Skin Rugosity	Temperature	Tenderness	Consistency	Fluctuation	Transillumination	Get above the Swelling	Testis felt seperately	Spermatic cord	Diagnosis	Anaesthesia	Procedure	Intra operative findings				Drain	POC	POS	FU
																			Testis	Epididymis	Fluid	Sac				
26	104595	Puttaraju	35	SS+PA	1m	R	P	N	P	Cy	P	P	P	YES	N	EC	LA	EX	N	N	CC	N	NK	PA	5	2m
27	196186	Chandrashekar	29	PA	1d	R	P	EL	P	Cy	P	A	P	NO	N	HAE	SA	EVC+EV	N	N	HF	N	NK	PA+HE	9	4m
28	225872	Chandrashekar	39	SS+PA	1y	B/L	A	N	P	Cy	P	P	P	NO	N	PVH	SA	EV	N	N	AC	N	K	PA+SO	8	4m
29	239929	Narase gowda	50	SS+PA+F	1m	R	A	EL	P	Cy	P	A	P	NO	N	PYO	SA	I&D	IF	TH	PUR	N	K	PA+SO+IN	12	2m
30	292742	Deepak	50	SS+PA	2m	R	A	N	P	Cy	P	P	P	YES	N	EC	SA	EX	N	N	CC	N	NK	PA	7	2m
31	327760	Jagadeesh	13	SS	1y6m	R	P	N	A	Cy	P	P	P	NO	N	PVH	GA	LO	N	N	AC	N	K	PA+SO	8	6m
32	121049	Thamme Gowda	47	SS	2y	R	P	N	A	Cy	P	A	P	YES	N	SC-S	LA	EX	-	-	PU	-	NK	PA	3	3m
33	208587	Narasaiah	60	SS	1y	R	P	N	A	Cy	P	A	P	YES	N	SPE	SA	EX	N	N	BC	N	NK	PA	5	2m
34	280078	Chetan	39	SS	1y	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	EV	N	N	AC	N	K	PA	8	4m
35	327238	Ashok	12	SS	2y6m	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	EV	FL	TH	AC	TH	K	PA+SO	8	4m
36	47121	Rathan	16	PA	2d	R	P	EL	P	Cy	P	A	P	NO	N	HAE	GA	EVC+EV	N	N	HF	N	K	PA+SO	8	6m
37	50974	Krishnappa	46	SS+PA	1y6m	L	A	N	P	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	5	2m
38	74337	Shivlinge Gowda	38	SS+PA	3y6m	B/L	A	N	P	Cy	P	P	P	NO	N	PVH	SA	EV	N	N	AC	TH	K	PA+SO	8	4m
39	75682	Rame Gowda	36	SS+PA	2y	L	A	N	P	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	5	4m
40	86445	Shivraj	21	SS	1y6m	R	P	N	A	Cy	P	P	P	YES	N	EC	SA	EX	N	N	CC	N	NK	PA	5	2m
41	82149	Pavan Kumar	14	SS	10m	R	P	N	A	Cy	P	P	P	YES	N	EC	GA	EX	N	N	CC	N	NK	PA	8	6m
42	75390	Nagaraj	50	SS	4y	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	EV	N	N	AC	TH	K	PA+SO	8	2m
43	87378	Basappa	40	SS	1y	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	8	4m
44	89297	Ramakrashna	49	SS	6m	L	P	N	A	Cy	P	P	P	YES	N	EC	LA	EX	N	N	CC	N	NK	PA	5	2m
45	85785	Raghu	19	SS	8m	R	P	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	8	6m
46	117632	Sanjay Yadav	22	SS	4m	B/L	A	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA	8	6m
47	182632	Teja	21	SS	10m	R	P	N	A	Cy	P	P	P	YES	N	EC	SA	EX	N	N	CC	N	NK	PA	7	6m
48	250185	Manje gowda	60	SS+PA	5y	B/L	P	N	P	Cy	P	A	P	YES	N	SC-M	SA	EX	-	-	PUR	-	NK	PA	5	-
49	262650	Papanna	50	SS	2y	R	A	N	A	Cy	P	P	P	NO	N	PVH	SA	LO	FL	N	AC	N	K	PA	8	2m
50	287989	Lakshmeesha	32	SS+PA	1y6m	L	A	N	P	Cy	P	P	P	NO	N	PVH	SA	LO	N	N	AC	N	K	PA+SO	8	4m

Sl.No.	Name	Age	Ip no	presentation	Diagnosis	Treatment	Incision
1	muniyandi	39	12376	swelling	epididymal cyst	excision	small
2	ramu	32	12567	swelling	small hydrocele	excision&eversion	small
3	ravi	47	12466	swelling	epididymal cyst	excision	small
4	raju	54	12667	swelling &pain	spermatocele	excision	small
5	sonu	45	12890	pain	varicocele	ligation	small
6	veera	56	12897	swelling	sebaceous cyst	excision	small
7	moham	43	12908	swelling	large hydrocele	excision&eversion	large
8	sundar	70	12896	swelling	epididymal cyst	excision	small
9	chandru	34	123789	swelling	spermatocele	excision	small
10	chanakya	56	12789	pain	varicocele	ligation	small
11	saravana	45	12786	swelling	sebaceous cyst	excision	small
12	sam	34	12745	swelling	small hydrocele	excision&eversion	small
13	raja	45	12890	swelling&pain	large hydrocele	excision&eversion	large
14	sakti	56	12908	swelling	epididymal cyst	excision	small
15	guna	67	12568	swelling	spermatocele	excision	small
16	jeevan	58	12788	pain	varicocele	ligation	small
17	mani	57	13467	swelling	sebaceous cyst	excision	small
18	ganapaty	45	13467	swelling	large hydrocele	excision &eversion	large
19	seeni	67	13566	swelling	epididymal cyst	excision	small
20	subu	45	13456	swelling	spermatocele	small	small
21	ravi	58	12897	pain	varicocele	ligation	small
22	kartik	45	12888	swelling	sebaceous cyst	excision	small
23	krishna	57	12745	swelling	large hydrocele	excision&eversion	large
24	kannan	70	12890	swelling	epididymal cyst	excision	small
25	prabu	43	12897	swelling	spermatocele	excision	small

26	manikam	67	12893	pain	varicocele	ligation	small
27	kumar	56	12908	swelling	sebaceous cyst	excision	small
28	mookan	67	12894	swelling	large hydrocele	excision&eversion	large
29	neelan	69	16798	swelling	epididymal cyst	excision	small
30	kani	45	18967	swelling	small hydrocele	excision&eversion	small
31	sentil	43	13876	swelling	epididymal cyst	excision	small
32	babu	56	15799	swelling	large hydrocele	excision&eversion	large
33	manikandan	33	16758	swelling	small hydrocele	excision&eversion	small
34	kathir	76	12890	swelling	epididymal cyst	excision	small
35	balu	45	16790	swelling	large hydrocele	excision&eversion	large
36	boopaty	32	18765	swelling	epididymal cyst	excision	small
37	ravana	56	17876	swelling	large hydrocele	excision&eversion	large
38	kiran	54	16789	swelling	epididymal cyst	excision	small
39	surya	34	17890	swelling	large hydrocele	excision&eversion	large
40	ramesh	56	16789	swelling	small hydrocele	excision&eversion	small

KEY TO MASTER CHART

A	-	Absent
AC	-	Amber Coloured fluid
B/L	-	Bilateral
BW	-	Barley White coloured fluid
CC	-	Crystal Coloured fluid
EC	-	Epididymal Cyst
EL	-	Elevated
EN	-	Enlarged
EV	-	Eversion of Sac
EVC	-	Evacuation of clot
EX	-	Excision
F	-	Fever
FL	-	Flattened
GA	-	General Anaesthesia
HAE	-	Haematocoele
HE	-	Haematoma
HF	-	Haemorrhagic Fluid
IF	-	Inflammed
IN	-	Infection
I.P.no	-	In Patient Number
I & D	-	Incision and Drainage
K	-	Kept
L	-	Left
LA	-	Local Anaesthesia
LO	-	Lords Plication
m	-	Months
N	-	Normal
NK	-	Not Kept
P	-	present
PA	-	Pain
PVH	-	Primary Vaginal Hydrocoele
PU	-	Purulent
PY	-	Pyocele
R	-	Right
SA	-	Spinal Anaesthesia
SC-M	-	Sebaceous cyst multiple
SC-S	-	Sebaceous Cyst Single
Sl.No	-	Serial Number
SE	-	Scrotal Edema
SPE	-	Spermatocoele
SS	-	Scrotal Swelling
TH	-	Thickened
Y	-	Years

Ref.No.8102/E1/5/2014

Madurai Medical College,
Maduai -20. Dated: 10.10.2014.

Institutional Review Board/Independent Ethics Committee
Capt.Dr.B.Santhakumar,MD (FM). deanmdu@gmail.com
Dean, Madurai Medical College &
Government Rajaji Hospital, Madurai 625 020 . Convenor

Sub: Establishment – Madurai Medical College, Madurai-20 –
Ethics Committee Meeting – Meeting Minutes - for September 2014 –
Approved list – reg.

The Ethics Committee meeting of the Madurai Medical College, Madurai was held on September 12th 2014 at 10.00 Am to 12.00 Noon at Anaesthesia Seminar Hall at Govt. Rajaji Hospital, Madurai . The following members of the Ethics Committee have attended the meeting.

1.Dr.V.Nagarajan,M.D.,D.M(Neuro) Ph: 0452-2629629 Cell No.9843052029 nag9999@gmail.com.	Professor of Neurology (Retired) D.No.72, Vakkil New Street, Simmakkal, Madurai -1	Chairman
2.Dr.Mohan Prasad, MS.M.Ch. Cell.No.9843050822 (Oncology) drbkcmp@gmail.com	Professor & H.O.D of Surgical Oncology (Retired) D.No.32, West Avani Moola Street, Madurai.-1	Member Secretary
3. Dr.L.Santhanalakshmi, MD (Physiology) Cell No.9842593412 dr.l.santhanalakshmi@gmail.com.	Vice Principal, Prof. & H.O.D. Institute of Physiology Madurai Medical College	Member
4.Dr.K.Parameswari, MD(Pharmacology) Cell No.9994026056 drparameswari@yahoo.com.	Director of Pharmacology Madurai Medical College.	Member
5.Dr.S.Vadivel Murugan, MD., (Gen.Medicine) Cell No.9566543048 svadivelmurugan_2007@rediffmail.com.	Professor & H.O.D of Medicine Madurai Medical College	Member
6.Dr.A.Sankaramahalingam, MS., (Gen. Surgery) Cell.No.9443367312 chandrahospitalmdu@gmail.com	Professor & H.O.D. Surgery Madurai Medical College.	Member
7.Mrs.Mercy Immaculate Rubalatha, M.A., Med., Cell.No.9367792650 lathadevadoss86@gmail.com	50/5, Corporation Officer's Quarters, Gandhi Museum Road, Thamukam, Madurai-20.	Member
8.Thiru.Pala.Ramasamy, B.A.,B.L., Cell.No.9842165127 palaramasamy2011@gmail.com	Advocate, D.No.72,Palam Station Road, Sellur, Madurai-20.	Member
9.Thiru.P.K.M.Chelliah, B.A., Cell No.9894349599 pkmandco@gmail.com	Businessman, 21 Jawahar Street, Gandhi Nagar, Madurai-20.	Member

The following Project was approved by the Ethical Committee

Name of P.G.	Course	Name of the Project	Remarks
Dr.Biravinth Solomon f.solomon07@gmail.com	PG in MS (Surgery), Madurai Medical College and Govt. Rajaji Hospital, Madurai.	Methodology and Management of cystic swellings of scrotum	Approved

Please note that the investigator should adhere the following: She/He should get a detailed informed consent from the patients/participants and maintain it confidentially.

1. She/He should carry out the work without detrimental to regular activities as well as without extra expenditure to the institution or to Government.
2. She/He should inform the institution Ethical Committee, in case of any change of study procedure, site and investigation or guide.
3. She/He should not deviate the area of the work for which applied for Ethical clearance. She/He should inform the IEC immediately, in case of any adverse events or Serious adverse reactions.
4. She/He should abide to the rules and regulations of the institution.
5. She/He should complete the work within the specific period and if any Extension of time is required He/She should apply for permission again and do the work.
6. She/He should submit the summary of the work to the Ethical Committee on Completion of the work.
7. She/He should not claim any funds from the institution while doing the work or on completion.
8. She/He should understand that the members of IEC have the right to monitor the work with prior intimation.

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Ethical Committee

Chairman
Ethical Committee

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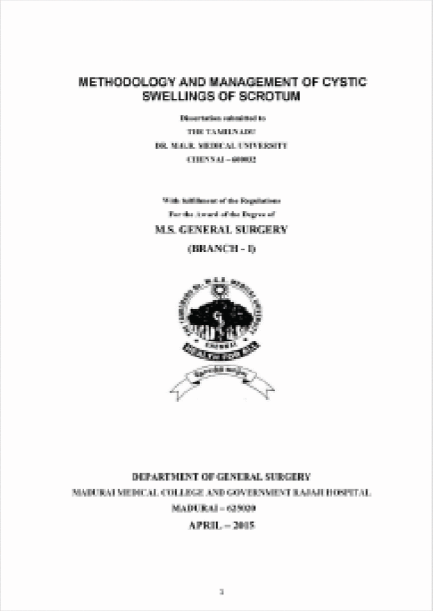

METHODOLOGY AND MANAGEMENT OF CYSTIC SWELLINGS OF SCROTUM

Dissertation submitted to
THE TAMILNADU
DR. M.G.R. MEDICAL UNIVERSITY
CHENNAI – 600032

With fulfillment of the Regulations
For the Award of the Degree of
M.S. GENERAL SURGERY
(BRANCH - I)

DEPARTMENT OF GENERAL SURGERY
MADURAI MEDICAL COLLEGE AND GOVERNMENT RAJAJI HOSPITAL
MADURAI – 625020
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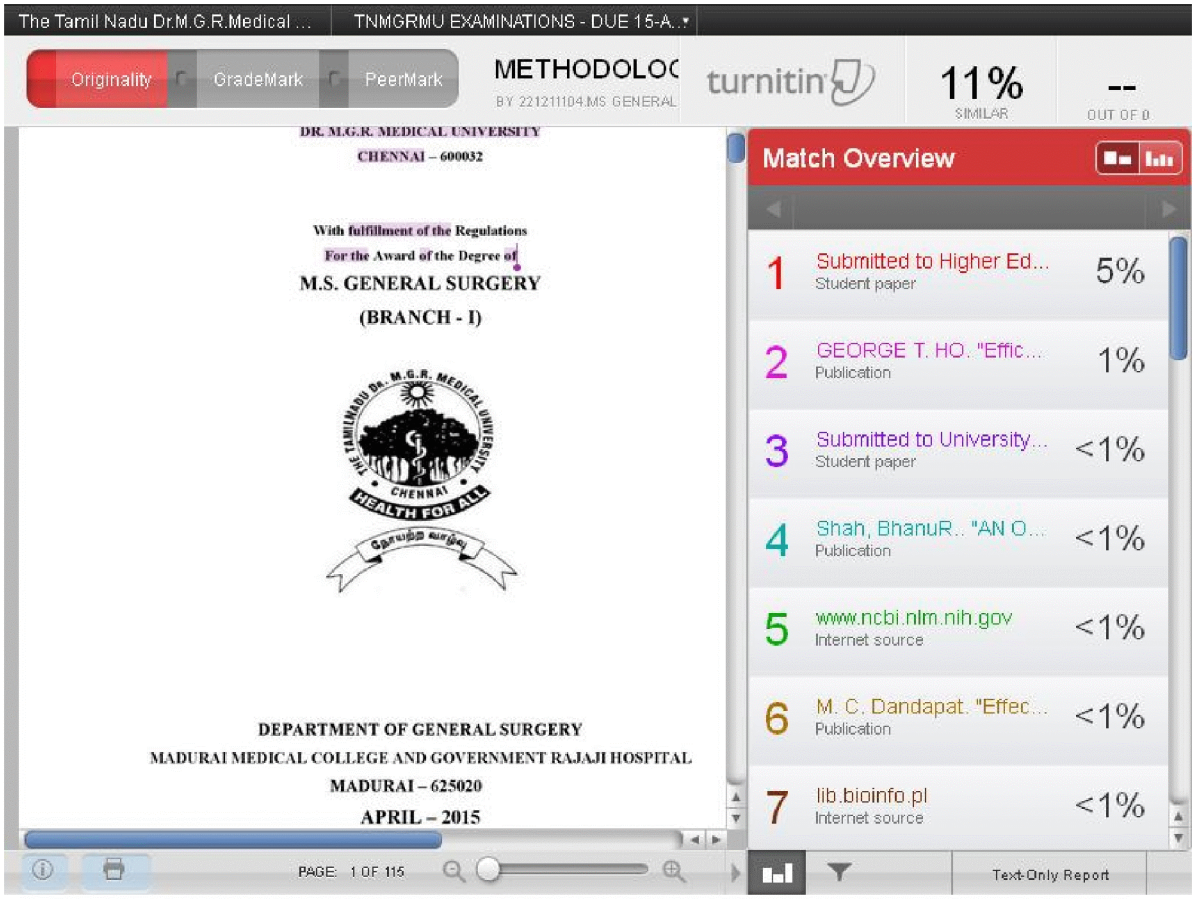
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